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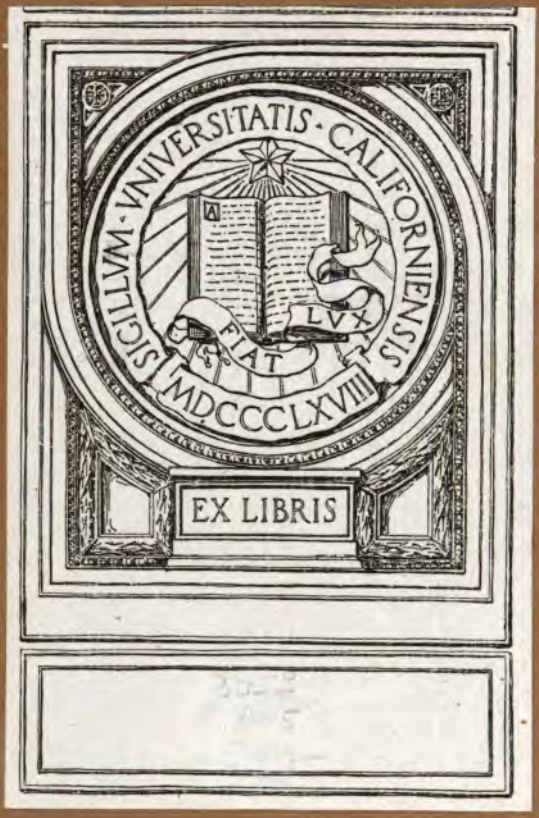

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TEXT-BOOK
OF
SCHOOL AND CLASS MANAGEMENT

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TEXT-BOOK
OF
SCHOOL AND CLASS MANAGEMENT

BY

FELIX ARNOLD, A.B., PD.D., PH.D.

VOL. II

ADMINISTRATION AND HYGIENE

UNIV OF CALIFORNIA

New York
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PREFACE

In the first volume were discussed coöperation between principal and teacher, and class management. The present volume takes up further problems of school control, as organisation, classification, hygiene, etc., and such aspects of administration as concern the principal, as, the school building, the school personnel, the function of the school, and the school boards. Both volumes constitute a complete text-book of school management and administration in so far as these phases of school work concern both principal and teacher.

FELIX ARNOLD.

New York, City.

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UNIV. OF CALIFORNIA

PART I

PRINCIPAL AND CHILD

CHAPTER I

ORGANISATION

§ I. Nature of Organisation

1. **Meaning of organisation.** In a vague and general way organisation is sometimes made to include almost all of the principal's activity in promoting efficiency in instruction and discipline. Occasionally it is made to include classification. A distinctive meaning, however, inheres in the term 'organisation.' Before the teacher comes into contact with the pupils, before the pupils are classified, before any work can go on in a systematic manner, certain arrangements must be made by the principal. Such arrangements must have in view the good of the children, and the effective activity of the teacher as conditioned by the activity of the children. In organisation the principal does not deal directly with the children. He does not necessarily come into any contact with them. But such things as make for efficiency are so arranged, apportioned, improved, or acquired that the child upon his entrance into the school finds matters already prepared for the proper development of his activity. Organisa-

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tion may be considered as such control of all the school facilities, material, and personnel as tends to produce the highest efficiency in discipline and instruction.

A comparison between organisation and other aspects of school management may be helpful in bringing out the meaning of the former. In cooperation principal and teacher work on the pupil both directly and indirectly. The nature of cooperation necessitates personal contact between the principal and the teacher, and the teacher and the pupils, with efficiency in instruction and discipline in view. In classification the principal deals directly with the pupils often before any contact between teacher and pupil is possible. In organisation, however, the principal influences the pupil indirectly with the means at his disposal. Often the principal alone must decide what material is to be ordered, what assignments are to be made, what routine is to be followed, before any contact between teacher and pupil, or even between principal and pupil, can be made.

2. **Function of organisation.** The function of organisation is (1) to provide material arrangements, (2) to assign teachers, and (3) to arrange for instruction and discipline in such a way as to secure the greatest efficiency in classroom work. Material arrangements involve (1) parts of the school building to be used by the pupils, as exits and entrances, (2) such statistical work as is officially required and is needed in promoting regularity of attendance, etc., (3) ordering, distribution, etc., of material and supplies. Assignment of teachers necessitates consideration of the fitness of the teacher for the grade, the size and position of the classroom, etc. Arrangements for instruction require a choice of the general method to be followed, whether

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individual, class, group, high school, or what not. There is also involved some study of the order and arrangement of the periods of instruction in class work.

Much of the organisation of a school must be worked out by the principal alone. Much must be adopted only tentatively, to be modified as the actual situations demand. Sometimes the principal must organise a school which has just opened. Often he is appointed to a school in which previous organisation has become routine. Whatever be the situation the principal should carefully study the problem before him. He should find out what are the means which have been placed at his disposal. He should then consider what is necessary for effective instruction and discipline. The child, and then the teacher-child relationship should guide his judgment and effort. Even when routine organisation is present in the school to which he has been appointed the existing order may need modification and improvement. Change, however, is not necessarily improvement.

§ II. Material Arrangements

1. **Entrance of pupils.** The child should pass to the classroom in the most safe, quiet, speedy, and comfortable manner. Factors to be considered in this connection are the number, age, and sex of the pupils, the time of entrance, and the novelty in the process.

(*a*) *General conditions.* In general, it 'should be kept in mind that (1) the primary and the grammar pupils should be kept separate, (2) the boys and the girls should be kept as far apart as possible, and (3) morning and afternoon entrances are slightly differ-

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ent in character. The positions of the rooms relative to the stairways and the number of entrances must also be considered.

(*b*) *Boys' and girls' entrances.* Girls should be required to enter at a part of the building removed from that used by the boys, especially in the case of older children. Kindergarten children should have a separate entrance if possible. Special precautions should be taken for their safety.

(*c*) *Use of the yard.* As soon as pupils enter the building, they should be allowed to talk, stand round in groups, play quietly, and the like. Before passing to their rooms, the children should be required to fall in lines and remain for a minute or two at 'attention.' Rigid lines for lengthy periods, however, should not be tolerated. On the other hand, boisterous play, undisciplined behavior, or unnecessary shouting should not be allowed. Should the weather be cold or inclement, children should be permitted to enter the yard as soon as they arrive.

(*d*) *Signals.* Classroom bells should be rung when the teacher is supposed to be in the room. At the same time, yard bells or gongs should indicate the time for the entrance of the pupils from the yards to the classrooms. Classroom bells should be rung five minutes before the beginning of the classroom sessions, and final gongs when sessions are supposed to begin. Further signals might be given, as, waving of flag, call of bugle, etc., to indicate to pupils that they have but a few more minutes in which to enter as 'early.'

(*e*) *Manner of entrance.* In going upstairs, pupils should pass in single file on the inner side of the stairway. In passing through the halls, they should, if pos-

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sible, keep to the right. They should not be required to walk on their toes since this forces them into unnatural, distorted, and awkward positions.

(*f*) *Novelty of entrance.* — When a new school is opened, or during promotion, special precautions are necessary to ensure quiet and speedy entrance of the pupils. Directions should be given as to the floor and room number, and guides might be posted to facilitate matters. A few pupils and some of the teachers should be on duty during the first day to ensure orderly entrance. If necessary, as at night school, teachers should be stationed one at each floor entrance to direct the newcomers to their rooms.

2. **Dismissal of pupils.** Dismissal of pupils may be made under normal conditions or in special emergencies.

(*a*) *Routine dismissal.* If possible, each floor should have exclusive use of the stairway which it uses. If it is not possible to assign stairways in this manner, the lower floors should be given the right of way in case of conflict. In fact they might be dismissed a few minutes earlier. In forming lines for dismissal some uniform method should be used throughout the school. Signals should be similar to those used in the case of entrance. Bells five minutes before the close of the session, and final gongs are all that are necessary.

(*b*) *Emergency dismissal.* 'Fire' drills should be arranged by the principal the first week of the term. If possible, all classes should move at once. All stairways should be used, and both sides of the stairways utilised if necessary. It might be well to have the emergency drill the same as routine dismissal, with the exception that the children move on the 'double quick.'

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Three bells with three gongs may be given to signify, 'all out.' Two bells with two gongs may be given to signify dismissal to the yards without hats, coats, or books. Any other combinations seem hardly necessary. Once the children are in the yard, they may be sent home, or returned to their rooms. There should be practice in emergency drills when the children are assembled for the morning exercises, when one or more stairways are blocked, when the pupils are at recess or changing rooms, and so on. Drills may be given on days preceding holidays, on rainy or cloudy days, on examination days, etc. Record should be made of the time taken to clear the building immediately after the last gong has rung. Each teacher should receive explicit instructions as to the mechanics of dismissals, both routine and emergency.

3. **Statistics.** Various records are necessary in connection with the teacher, the pupil, supplies, and the like.

(*a*) *Record of teachers.* Record should be kept of the date of a teacher's appointment to the school, of his time of entering and leaving, of his lateness, and of his absence. Time clocks are advisable in all the schools.

(*b*) *Record of pupils.* The pupil's name, date of birth, residence, parent's name, and class are usually recorded. Various other data are usually required.[1] Of considerable importance as far as school management is concerned, are the attendance of children, their physical condition, such as weight, height, vision, defects, etc., the class assigned, promotions, and general progress in school work. Such data are usually kept

[1] See, Allen, W. H., and Snedden, D. S., *School Reports and School Efficiency.*

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in duplicate on cards. In addition it might be advisable to have class lists which contain the names of the children in the class and the dates of birth. Such lists will be sufficient if information is wanted concerning the location of any child.

(*c*) *Records for night school.* Statistics in night schools and vacation schools need not be so elaborate. It might be of advantage to record (1) the name of the pupil, (2) date of birth, (3) nationality, (4) occupation, (5) residence, and (6) attendance. In most cases specific records are officially prescribed.

(*d*) *Register and enrolment.* A distinction is sometimes made between register and enrolment. The enrolment includes all those who have applied for admission to the school. The register includes those who have attended for some short period, and who are still on the rolls.

(*e*) *Record of supplies.* The amount, kind, price of supplies and the date when ordered should be recorded. Note might also be made of the date of receipt. Some general classification might be of advantage, as, (1) material used daily, as, paper, wood, clay, pencils, etc., (2) books, maps, etc., and (3) apparatus, tools, and the like.[2]

(*f*) *Log-book.* A book should be kept to note interesting incidents connected with the school, important events, and the like. Receptions, holidays, etc., should be recorded with brief notes indicating the nature of the program, the time spent, the plan of procedure, and so on. The name of new teachers should be entered, with the date of appointment. Any important changes

[2] The selection, distribution, care, etc., of supplies are treated in Volume I., Ch. IV., § 5.

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in the personnel or material of the school should be recorded. Notes might be made of any experimental work carried on in the school, etc.

(*g*) *Visitors' book.* Visitors should be asked to inscribe their names in a book set aside for the purpose. The superintendent is usually considered a visitor. In general, all records should be carefully kept. Some fixed period should be set aside each month for a general cleaning up in this connection.

4. **School supplies.** The principal should first order those supplies which are necessary for effective classroom work. Then should come such books as are needed in classroom instruction. Books which are needed for home study, maps, charts, etc., should be ordered only when the 'sinews of war' have been provided. A reserve supply of such material might be maintained to prevent shortage. As regards the books used by the different classes (with the exception of primary readers), it is advisable to have a different book in the same subject for each grade. Change in books from grade to grade will provide different viewpoints for the pupils, will yield increased interest, will allow of topical study, and provide for numerous associations.

Books used by a class should be placed in charge of the class teacher. Such books should remain in the teacher's charge as long as his class uses them. In each book should be pasted a slip allowing for entry of the following, (1) date of receipt by the pupil, (2) name, (3) class, and (4) date of return. There should be an inspection of books each month. Public property should be cared for as zealously as private. This holds for both high and elementary schools.

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§ III. Assignments of Teachers

1. **Class assignments.** In general, classes of boys of the fourth or fifth years or of higher grade should be given to men. All classes of girls should be given to women. In the lower grades, care should be taken in the assignments of teachers to boys' classes. Some teachers are specially fitted to control boys, others, to control girls. In the promotion of teachers to higher grades, time of service should be considered only when all other conditions remain the same. Efficiency in instruction and discipline should be the first consideration.

2. **Extra assignments.** Yard duty, athletics, assembly, dancing, etc., call for work outside of the regular classroom duties. Each teacher should be required to take up part of such outside work. Yard assignments may be made by the week or month. It is usually advisable to give one teacher full control of any activity, as, yard duty, assembly, marching, dancing, etc.

§ IV. Instruction

1. **Individual *versus* class instruction.** That it is impossible to spare a sufficient number of adults from the world's work to allow of individual instruction is very evident. It is this which makes Rousseau's scheme a purely chimerical one as far as popular education is concerned. But if individual instruction has any advantages it behooves us to study such instruction so that we may combine it in some manner with class instruction.

(*a*) *Advantages of individual instruction.* With effec-

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tive individual instruction a child's individual powers and talents may be fostered and developed. One with an inclination for the natural sciences can have his desires fully gratified. The abstract subjects, too, will be more readily tolerated in such a case. Moreover, a child will be impelled to continue his studies a longer time and will not seek to drop them as soon as he can find a legitimate excuse for so doing.

As regards the process of instruction the special difficulties with which the child may meet can receive immediate and proper attention. The teacher does not have to waste time in explaining away imaginary difficulties or in teaching what the child may already know. This is often done in class instruction. Moreover, more time can be devoted to recreation and study when a single pupil is under the teacher's charge. The child does not have to sit waiting for the other pupils to finish, nor does he have to sit idle while other pupils are reciting. All the school time can be spent in study or recreation.

An extremely flexible program and course of study may be followed. Special incidents in the outside world may be utilised, and any subject neglected on such an occasion may be taken up later. A pupil can go with the teacher directly to situations of passing or of permanent interest. Thus, an eclipse of the sun, dredging or other operations, special exhibitions, lectures, etc., may be studied as soon as the opportunity arises.

In discipline firm bonds of sympathy and friendship may serve as a basis of control. The intimate nature of the social intercourse necessary will enable the child to acquire correct forms of expression and those touches

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of refinement which are possible only by direct contact with cultured persons. The example of the teacher is constantly before the pupil. Such contact is specially needed in the case of the more untutored children. Refined children whose parents can afford individual instruction do not stand in need of such contact. Discipline can more easily be adapted to the idiosyncrasies of the child. Leeway can be given in one direction, correction can be effectively administered in another. Control can be much more lax and mild than with class instruction.

(*b*) *Disadvantages of individual instruction.* In individual instruction the child's ego becomes unnecessarily developed. He does not meet with the social friction necessary to round off his unsocial and rougher edges. The fond mother fallacy tends to creep into methods of instruction and discipline and the child suffers thereby. In addition a feeling of caste may tend to arise and grow. The world of values will tend to revolve around the individual side of the child's nature. Differences in others may be looked upon as signs of ignorance or of inferiority.

The child is robbed of his birthright, wholesome play, if he is shut from intercourse with other children of his age. While he may seem correct and proper to an adult, still he may be growing up in a dwarfed and distorted manner. Individual help, too, may be overdone. Constant attendance in instruction will in the end leave the child helpless and groping when such aid is withdrawn. To expatiate on this is not necessary.

Constant individual instruction may end in nervous breakdown and attacks of sickness. This sometimes

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happens when parents require of their children extra lessons in music, language, drawing, etc. The lapses necessary when a number of children are under the instruction of a single teacher allow of relaxation and rest. The other extreme, however, is also possible. With the necessary lack of conscience the teacher may allow the pupil to indulge in prolonged periods of idleness. With a class the pressure of numbers forces the teacher to keep the children busy.

(*c*) *Advantages of class instruction.* For popular instruction it is class instruction on which we must depend. The advantage of reaching as many as possible by means of class instruction is therefore an essential and necessary aspect of this form of education.

A class forms a good medium in which a child can develop and acquire social self-control. There may be developed a social background of response which will approve and disapprove as a situation demands. The fact that children are in a class, however, does not imply that such a background is necessarily present. Suppression of the children may totally destroy such benefits as accrue from effective class management.

Quintilian mentions a number of advantages inhering in the nature of class instruction.[3] Emulation is possible. Friendships may be formed. Pupils may profit by the advances and the errors of others. Younger children find it more pleasant and natural to imitate their schoolfellows than to imitate the teacher. The teacher feels a greater incentive when he is addressing a number than when he is instructing only one.

[3] See, Quintilian's *Institutes of Oratory, or Education of an Orator*, Eng. tr. by J. S. Watson, Bk. I., Ch. I., Monroe, Paul, *Source Book of the History of Education*, 459.

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(*d*) *Disadvantages of class instruction.* When we consider the disadvantages of class instruction we find in theory and especially in practice a most glaring array. As such instruction is usually practised the child is the loser in every way. He is massed with a number of other children and measured by averages. He is placed in a strait-jacket of routine and drill and mercilessly driven if he fails to respond. If the child fails in one or more of what are considered 'essential' subjects he may be forced to repeat the weary round once again. That a child may be specially fitted for work which varies from that which is set before him, that his deficiencies in one direction may be more than counterbalanced by his talents in another which the school may not consider of worth in classification will be readily admitted by one who is not swayed by pedagogical bias. How many variations are possible will be seen when one calls to mind the number of pupils in a class.

Even were all the instruction adapted to the pupil's talents and needs the size of a class would prevent him from getting the full benefit of it. Mass teaching as it is usually conducted scatters about a great deal of information for which the children make a scramble as it were. The recitation, which is closely bound with mass teaching, gives all the pupils little to do at any one time. If all the pupils are made more or less proficient little ground can be covered. This was shown by a series of tests carried on by President Eliot of Harvard.[4] By letting two high school graduates read aloud the reading matter given to children for six years of the grammar school he found that they

[4] Eliot, Charles William, *Educational Reform*, 185.

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accomplished the task in forty-six hours. He tested them with the eighty-eight pages of an arithmetic used for two school years and found that the high school graduates did all the examples correctly, writing everything out in full, in fifteen hours. In the school, moreover, he observed what every teacher sees daily. Some of the children did the set tasks in fifteen minutes while others of the same grade took fifty-five minutes to do the work. Between these limits came the rest of the children with varying abilities. While the rest were working their examples the brighter children sat and did nothing.

Perhaps the worst evil which class instruction has inflicted on systematic education is a hidebound tradition which in practice sanctions among other things the so-called disciplinarian, ineffective verbal teaching, 'cram' examinations, and promotion by mass. This tradition makes itself felt by the attitude which is taken by teachers towards their work, by the public opinion of a school which ignores or suppresses attempts at improvement in method or beneficial changes or additions in the course of study, and sometimes by the actions of superior officials who unknowingly block progress and improvement. When a new teacher enters the school such tradition tends to mold him to the ways of his elders and to look askance or even actively to disapprove any efforts which he may put forth to develop conduct in a humane way or to instruct with efficiency.

(*e*) *Effects of the class on the individual.* An interesting and scientific study of the effects of the class on individual work was made by August Mayer.[5] He

[5] Mayer, August, *Ueber Einzel- und Gesamtleistung des Schulkindes*, aus dem *Archiv für die Gesamte Psychologie*, 4, 1904.

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tested a class of fourteen boys both individually and collectively. The exercises which he gave to the children were (1) dictation, (2) oral arithmetic, (3) filling-in exercises in which the pupils supplied the only possible missing verbs in a number of sentences, (4) memorising of nonsense syllables, and (5) written arithmetic. The work was of a general nature somewhat different from the class work but well within the children's power. Three sets of such exercises were given with the directions to work (1) quickly and neatly (*rasch und schön*), (2) very neatly and quickly (*recht schön und rasch*), and (3) very quickly (*recht rasch*). The record of the time required by the individuals and by the class and the record of errors made by the individuals and by the class were taken.

Mayer found that when the children were asked under normal conditions to work quickly and neatly they did the work more speedily and accurately as a class than as individuals. Not only were the averages of the class better than those of the individuals, but the individuals themselves did better work when with the class than when alone. It requires something more than emulation to account for this. When individuals work together there is operative the contagion of numbers, the restriction of emulation to the work in hand, the repetition of suggestions which arise, and the general furthering aspects of class work, as the similarity of effort put forth, the effects of discipline and habit, the supervision of the teacher, and the like. An individual working by himself does not receive such external stimulation which is of the kind which a child needs. Distractions and arresting influences can get a firmer foothold when the individual is alone.

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When the pupils were told to work very neatly and slowly they took more time as a class than as individuals. As a class, however, they made less errors. When they were told to work very fast the time was again longer with the class than with the individuals. As a class in this case they made more errors than as individuals. Pupils working as a class would tend to take more time than when working alone for reasons similar to those given above. Each pupil would hesitate under such instructions to be the first one to finish and so would wait a little longer before presenting his work. When told to work very quickly the general tension is intensified and probably makes the children overanxious and less accurate. Class work therefore may be considered as most favorable to rapidity and accuracy under normal conditions of instruction.

Mayer also found that after holidays the children in the class felt the influences of the class less, and worked almost as they did when working individually. They made more errors and worked more slowly. He explains this by the fact that the social spirit in class instruction is still dormant after holidays because of the various holiday distractions and so requires some time before it can influence the children when they come together.

Another point of account is that pupils individually different were beneficially influenced in the class under normal conditions (*i.e.*, while working quickly and neatly). Bashful and timid children were also aided as were the more independent and sturdy pupils. Class instruction favored all the pupils under normal conditions.

(*f*) *Social psychology.* That the individual in a

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'crowd' acts somewhat differently than when alone is now becoming generally recognised. It will be profitable therefore to note briefly what are the characteristics of what Le Bon calls the 'crowd,' and of the more stable aggregate which Tarde terms the 'public.'[6]

Individuals acting temporarily under similar motivation or as a crowd are more impulsive, mobile, and irritable. As Le Bon[7] says, A crowd's acts are far more under the influence of the spinal cord than of the brain.' The aggregate is highly suggestible, catching at a phrase, following copy readily, and acting blindly as a situation seems to require. The feelings and the emotions become intensified and exaggerated to the point of violence. Once swayed by an opinion the crowd becomes unyielding and dictatorial in its demands. The general morality of the actions sanctioned by a crowd may be far below those sanctioned by the individuals when alone. It is this aspect of the crowd which makes class control so difficult for the new or the inefficient teacher.

On the intellectual side similar differences exist between the individual and the crowd. Simple, absolute, and uncompromising ideas are readily assimilated. Reasoning of any high order is generally out of the question. A catchword or phrase may have more effect than a closely reasoned argument. Theatrical representations, vivid impressions, unique and startling images, are generally effective in fixing belief or in exciting action. Affirmation, repetition, and contagion are the three means emphasised by Le Bon as being effective in guiding and controlling the actions of a

[6] Le Bon, Gustave, *The Crowd*, Tarde, G., *L'Opinion et la Foule.*
[7] *Ibid.*, 40.

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crowd. Contagion may be explained by imitation as set forth by Bagehot, Baldwin, and Tarde.[8]

The 'public' may be considered as a more stable aggregation than the crowd. It may be viewed as a crowd refined by individual thought and by less emotional group discussion. It is more conservative. It is animated by a tradition which changes slowly. Action may not be so sudden or violent as that of the crowd but it is more persistent and steady. Patience, more reasonable processes, and more lengthy periods of discussion may be expected of the public before definite action is taken.

2. **Class and individual instruction.** In arranging for the instruction of the pupils the principal should try to combine with class instruction some method of individual instruction which will preserve the advantages of class instruction and add those of individual instruction. The disadvantages of class instruction which demand consideration by the principal are (1) waste of time, (2) waste of subject-matter, and (3) neglect of the pupil as an individual having special aptitudes and talents. In practice much of the instruction is suited to individual methods in classroom work. So too is much of the subject-matter. The various activities which are possible in classroom work are (1) oral recitation, (2) text-book work, (3) test and examination, and (4) seat work with manual aids. Each of these should be considered with reference to the waste of time and subject-matter which is involved in class instruction.

[8] Bagehot, Walter, *Physics and Politics*, Baldwin, James Mark, *Social and Ethical Interpretations in Mental Development*, Fourth edition, Tarde, Gabriel, *The Laws of Imitation*, Eng. tr. by Elsie Clews Parsons.

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(*a*) *Oral recitation.* It is the oral recitation which is to blame for much of the present waste in class instruction. In such work either the teacher or one pupil does the talking or both carry on a discussion. The rest are partially idle. If each pupil is given one minute in which to recite, all pupils in a class of forty can be reached in a period of forty minutes. If a pupil receives five minutes individual attention then only eight can be called up in a single period. Often in the interest of the moment fifteen or twenty pupils may be called upon for varying periods of time, story and illustration by the teacher may take more time, and the period may then be found to have extended for an hour or more to the exclusion of some other subject. Whichever way one considers the oral recitation, something is lost by it.

In theory each pupil is expected to be mentally alert, to follow closely the thread of the lesson, to be ready to answer as soon as he is called on. The method of question and answer has been widely exploited as an effective means of prodding him to the proper degree of wakefulness. It is also assumed that enthusiastic presentation, personal magnetism of the teacher, or what not, should stimulate the pupil. As a matter of fact it is common for a pupil to protest if he is called on more than once or twice in the course of a lesson. Even under the most favorable conditions it must be granted that there is a loss in time. Each pupil can be fully active only when he is reciting. If a lesson is supposed to have been prepared at home this does not save the time wasted at school. Moreover, if any particular difficulties present themselves to the child the teacher must either concentrate all his attention

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on the child or ignore him. Each pupil can obtain the advantages of full and complete expression and of individual attention only with a repression of some of the activity of the rest of the children. This state of affairs has developed and sanctioned most of the rigid and repressive class government. Pupils are compelled to be quiet when one of their number is reciting. A visitor who absorbs what is being said may confuse his appreciation of the lesson with that of the rest of the children and may feel satisfied with the work. Should he attend to the children who are not active he may better understand how much they are losing in the oral work. Oral work is necessary in some subjects but it tends to become objectionally obtrusive in most of the classroom instruction.

(*b*) *Use of text-book.* Text-book work if not properly used is open to the same objections as those inherent in oral work. If the children are asked to study at home and to recite in school the school time is to a great extent wasted. If, however, the children are allowed to sit with books open before them while the recitation is going on, less time will be wasted. They will then have something to keep them occupied while one of their number is reciting. But in such a case the teacher can not be certain that all the children will take advantage of the opportunity. If the children are required to make synopses, topical outlines, diagrams of the matter under discussion, etc., much less time will be lost, especially if such work is inspected later by the teacher. Such work does not belong to the home. Direction is necessary, and moreover the children can make better use of their time out of school than by occupying themselves with verbal study. If

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the recitation deals merely with the hearing of verbal lessons then the teacher is of little account in classroom work. In the class the combination of text-book study under direction with oral recitation may be used to decrease loss of time.

(*c*) *Test and examination.* In the examination all the children are occupied for most of the time. Waste, however, may creep in between the time in which the fast pupils finish and the time in which the slow pupils finish. So long as a test is properly conducted it is as legitimate a means of instruction as any other. The examination will receive fuller treatment in the following chapter.

(*d*) *Seat work with manual aids.* The most common kinds of seat work are writing and figuring. Figuring on paper is necessary in written arithmetic. A class which may show up well in oral arithmetic may fail utterly when put to a written test. Written work also includes penmanship and composition exercises, as construction of topical outlines, collecting statistics, tabulating facts, and the like. In addition to these forms of seat work are drawing, coloring, cutting, folding, modeling, constructing, and the like.

Of the traditional subjects arithmetic and writing are taught best when the various manual aids are employed. Reading as such does not lend itself to seat work, though manual aids may be used to aid instruction in literary appreciation, etc. So too will grammatical analysis, spelling, meaning and use, etc., be taught better if seat work is given. Diagraming, picturing by drawing, color work, outlining of plots, tabulating of synonyms, rewriting in the manner of Franklin's method, etc., are some of the aids which can be adapted to the teaching of English. Geography and

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history will be better understood by the children if they model, construct, draw, outline, form tables for comparison, draw maps, etc. Manual training, drawing as such, nature study, science, and similar subjects can not be effectively taught unless the children are given seat work of some kind. Cooking, sewing, shopwork, and the like similarly require individual seat work.

(*e*) *Individual and class instruction.* Most of the school subjects lend themselves for the most part to some form of seat work. Such seat work should therefore be given when the class is instructed as a whole. After the teacher has shown a model, put a question, set a problem, indicated a plan of procedure, etc., he should explain, step by step, what is to be done. He should ask if further information is needed. In the first few lessons he should slowly construct a model or explain a problem before the class. Then each member of the class should do the work. While each pupil is in his seat writing, figuring, modeling, drawing, cutting, or what not, the teacher will have time to pass from one aisle or row to another and see how each child is getting on with the work. He can give individual help where he thinks that it is necessary. If a single mistake runs through most of the class work he can stop the class and give further directions. This method is usually followed in drawing, composition, writing, and similar lessons but it can be applied to most of the other subjects, as arithmetic, grammar, history, or geography.

In arithmetic, one type of example should be explained by the teacher, either verbally, or by scissor and construction work. The class should then do a

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series of problems of the type explained. If examples are to be worked, two or three of the same kind should be given. While all the children are occupied working them the teacher can pass up and down the aisles correcting, suggesting, helping, etc. As soon as a number of children have finished all the problems, the answers should be read. Most of the children will then have finished at least one or two of the examples. The brighter children will probably have finished all of them. If almost all of the pupils get one or more of the examples right, a few more may be given for practice, and while the rest of the class are doing the work, the teacher can give more time to the children who have failed on the examples given at first. To keep the faster pupils occupied, the teacher should give one or two examples more difficult than the regular examples. Such pupils should receive special credit and should be noted for special promotion.

In many instances seat work in arithmetic may take the form of modeling, paper cutting, color work, and the like. Mensuration, denominate numbers, fractions, decimals, etc., can be most effectively taught only by seat work with manual aids. The teacher should show the model, explain its construction, construct it piece by piece, and then allow the pupils to attempt construction of a similar one. Such work may consist of the construction in cardboard of a room, measuring of the sides, marking off the area in squares, etc., in cutting up units into divisions of ten, etc., in folding paper in the form of triangles, etc., and the like. The teacher can go among the children while they are at work and can give individual attention to the children who need it.

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In the other subjects similar methods may be employed. In history, topical outlines may be written by the pupils with books before them, comparisons may be drawn between different epochs, correlated geographical features modeled in clay, plans of battle sketched, etc. Seat work in geography and science may proceed in a similar manner, with greater emphasis on the manual work. Modeling, construction with wood or cardboard, objective analysis of specimens under the control of the children are some of the activities which may be made use of.

(*f*) *Group instruction.* In the work as thus far described the oral recitation and the use of oral English is to a great extent neglected. Such oral work is necessary in reading as such and in portions of all the other subjects. Since in such oral work only the pupil who is reciting receives the benefit of full expression it is evident that some time must be lost at least as far as oral expression is concerned. Some advantages may accrue to the others through listening to the one who is reciting, though this advantage is of somewhat doubtful advantage. Close attention to one who is reciting on a school subject requires a degree of application which is not possessed by the average adult. Some plan should therefore be devised by which only so many pupils should be taught together as are sure of having a chance to recite. If a pupil is allowed five minutes for recitation and discussion a group of only eight should receive special attention during a period of forty minutes. The other pupils should be given some seat work, a test or work which has a definite end and which will receive some form of approval at the close. Reading may thus be carried on during any of the periods devoted to the other subjects.

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The recitation in this restricted manner may proceed in any of the subjects.

The kind of seat work given during group recitation may vary. It may be modeling or color work. It may be the construction of topical outlines, summaries, comparisons, etc., from text-books. It should not if possible be purely verbal study from the book. This requires special direction as do the other subjects which are taught by group instruction. The group which is reciting may consist of the weaker pupils of the class. It may consist of the regular section of the class whose turn it is to receive individual attention. Groups may thus rotate in regular order, or some groups may receive more turns than others, according to the needs of the children.

Even in seat work some of the pupils will finish before the others if the same amount or the same kind of work is given to each. To prevent possible waste in this connection a few special problems somewhat more involved should be set for the brighter pupils or such pupils as are marked for special promotion. Those who work rapidly but incorrectly should be required to test their work, to go over it again, to finish it properly, etc. If one or more pupils show exceptional proficiency in the seat work going on they should be allowed to work up some subject in which they are weak or they should be placed in a recitation group more times than the regular number.

It has been suggested that while one group is reciting, the rest of the class may study. This is a relic of verbal teaching. In the various activities involved in seat work the children are learning unconsciously. Moreover, purely verbal study requires direction just as much

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as does the regular recitation. Study should be considered a matter for group work and sections should be formed for direction in study in the same manner as for the other subjects. If possible, study periods in special subjects should be combined with recitation in such subjects. In such a case the teacher should show the children how to study by topics, how to connect topics, how to form parallels, etc. From time to time he should call on pupils to test their progress. Such questioning should be considered as a kind of oral test and not as a recitation proper. While one pupil is being questioned the other pupils need not be concerned with what is going on.

For purposes of review or drill the whole class may be engaged in seat work. The teacher may then be seated unobtrusively in the rear doing nothing, but ready to give individual aid when asked. His real work is shown in the selection and distribution of material, in the preparations made and the directions given, and in the way in which the pupils are proceeding with their work. While seat work is going on, class supervision by the teacher is not difficult. A glance, a tap, etc., will be found sufficient to caution this or that pupil. If in addition the work receives some credit according to its neatness and accuracy, little more in the way of incentives will be needed. In fact such seat work is nothing but the result of proper guidance of the children's impulses and general restlessness. When no such work is given the pupils who are neglected in the oral recitation usually find something of their own to do.

The individual differences which are always found should receive attention in group work. The teacher should establish a maximum requirement for such sub-

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jects in which the pupil is strong and a minimum requirement for the subjects in which he shows no special talent or aptitude. If the pupil satisfies minimum requirements he should be rated proficient. If he falls below the minimum in any subject he should be placed in recitation groups more than the regular number of times and given individual aid if necessary a few minutes before or after sessions. The brighter pupils can spend more time in seat work of greater difficulty. Such pupils often require little more than suggestion and a short explanation of the work to be done. The work itself if properly selected is enough to stimulate them and call forth their power.

3. **High school instruction.** In high school instruction each teacher is restricted to one subject or field for which he has been specially trained. Usually he is required to hold a special license in his subject. Classes are not assigned to one room or to one teacher for the whole day but move from room to room for each period of instruction. One teacher may thus instruct several grades. Since this method of specialised instruction has been introduced into the elementary school under the name of 'departmental' instruction, some consideration of it is necessary.

(*a*) *Advantages and disadvantages in the high school.* The high school teacher usually holds a special license in a subject in which he can become a specialist. Continued teaching of the one subject will afford him the means of improving his methods in a very short time. If the instructor teaches a number of successive grades a certain continuity of instruction is possible. By the mechanical process of having pupils pass from room to room each subject must receive consideration. Pro-

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motion by subject becomes possible and a plan of 'conditions' will allow a pupil to do advanced work in other subjects than the one in which he is deficient. Supervision becomes more effective especially when one teacher has charge of the successive years. Individual capacities of the pupils can receive attention and will be brought out by such instruction since each teacher considers that his subject is of worth. The change from room to room affords relaxation and the contact with different teachers operates in a similar manner besides being a kind of social training.

There are a number of disadvantages. Theoretically a man may specialise in his subject and improve in his methods, and practically this is often the case. There is a danger, however, that specialised instruction may become mechanical, and that the instructor may lapse into deadened routine work. When each teacher has a special subject he tends to overlook the existence of teachers like himself and to give to the pupils unnecessarily large amounts of work. A daily program made in accordance with physiological and seasonal rhythms is practically impossible, though this disadvantage may be so distributed among all the classes that it will lose some of its effects. Conduct as such is usually neglected. Any provision for it must be made by assigning portions of the field of conduct to each of the instructors.

(*b*) *Advantages and disadvantages in the elementary school.* With the elementary school conditions are somewhat different from those in the high school. Many schools have departmental instruction grafted upon them without any special preparation of the teachers or any change in the material arrangements of the room. Specialisation, however, is not neces-

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sary in the elementary school as far as subject matter is concerned. Arithmetic, for example, which is specialised is no longer arithmetic, but a higher mathematics which is of little use in the elementary school, and which has little connection with elementary school work. In such subjects as music, drawing etc., but little conscientious application by the teacher is necessary to perfect himself to the degree necessary for classroom work. It is therefore evident that almost any of the subjects may be given to a teacher.

Method may be greatly improved if each teacher covers only a few subjects. Continuity of instruction is possible when successive grades are taught by the same teacher. Supervision is more effective since responsibility can be centered in a single teacher. When pupils pass from room to room all the subjects must receive attention, a condition which seldom exists in class instruction under a single teacher. Promotion is possible from grade to grade by subject as in the high school. The other advantages found in the high school, as appreciation of individual traits, relaxation through change of room and teacher, etc., are also possible in the elementary school.

The disadvantages mentioned in the case of the high school hold with more force for the elementary school. In addition, correlation becomes more difficult and the immaturity of the children renders the strain on them more intense. Should there be a weak teacher the effects of his inefficiency will be felt in all the grades. A modified form of group work, and individual-class instruction as explained above may be combined with departmental instruction. Some scheme may be devised by which a pupil weak in a subject may spend more

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time with the teacher of that subject and in a class other than his regular one.[9]

If a principal decides to have departmental teaching he should restrict it to the last two or three years of the school. In distributing the subjects he should try to keep certain combinations together. The grouping of the subjects should depend upon correlated aspects. Thus, geography and history go well together because of the dependence of industrial and commercial conditions upon physiographical aspects. Geography may likewise be connected either with drawing and manual training or with science. In the former case, modeling, drawing, painting, plotting curves, etc., form a common ground, and in the latter the various phenomena usually included under the term 'natural science,' as weather, volcanic action, river formation, climate, etc., belong in part to each subject. The human and social element in history enables it to be linked with literature. Music may be connected either with drawing or with reading, according as the esthetic or the expressive features are emphasised.

With such bases of connection in mind the teacher can make the following groupings: (1) English literature, composition, reading, grammar, and spelling, (2) drawing and science, (3) drawing and geography, (4) science and geography, (5) geography and history, and (6) arithmetic. Music may be added to drawing or to English. Other combinations are (1) drawing and music, (2) science, geography, and history, and

[9] On 'departmental instruction' compare the discussions in Parker, Francis W., *Talks on Pedagogics*, 395–400, Perry, Arthur C., *The Management of a City School*, 183–192, Kilpatrick, Van Evrie, *Departmental Teaching in Elementary Schools.*

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(3) history and English literature, If a teacher shows a special aptitude for subjects which have no inherent connection it might be well to give the teacher such subjects. Physical training should to some extent be given by each teacher. The special subjects, as, German, French, cooking, etc., are usually taught by a teacher appointed for the subject.

In constructing a schedule of periods of instruction, such subjects as drawing and composition should have two consecutive periods for a class. In many of the other subjects such doubling of periods will be possible if one subject is followed by another correlated with it, as, history and geography, geography and science, etc. Each class should spend the last session of the day and the last session of the morning with the teacher to whom the class has been assigned. It would be well if each class could spend the whole afternoon with the regular class teacher. So that the daily rhythm will be observed in the distribution of subjects each class should have an equal number of morning periods for such subjects as arithmetic and grammar. The mechanical arrangement of a departmental program should be made somewhat as follows. Five sets of squares should be ruled, one set for each day. At the side of the daily spaces should be the time allowed for each period. At the top should be the names of the classes, one to each vertical row. With these sets of squares before him the principal can rapidly fill in the subjects to be taken by each class for each day, or the room to which the class is to go, or the teacher who is in charge of the room and the subjects. Any one of these data will do and further explanations, as room, name of teacher, subject matter, can be indicated

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under the schedule. The following diagram may aid in understanding how the plan is to be arranged. It is planned for six teachers in the last two years of the elementary school. Care should be taken not to fill any teacher's period for the day with more than a single class. Thus, if *7B1* during the second period (10.20) is in the history class taught by Mr. *Y*, no other class can be assigned to Mr. *Y*, though the second period can be assigned to a different teacher. A second

	Monday							Tuesday							Wednesday
	7A1	*7A2*	*7B1*	*7B2*	*8A1*	*8A2*	*8B*								
9.40															
10.20															
10.40															
11.20															
12.00															
1.40															
2.20															
3.00															

Mr. *X* has arithmetic, Mr. *Y* has geography, history, and science, etc. Mr. *X* is in room *35*, etc.

schedule may be made from the one described, with the names of the teachers or of the rooms at the top instead of the names of the classes. The blank spaces are then filled in with the names of the classes. The former schedule will enable the principal to place any class at once, while the latter will enable him to see how each teacher's time is occupied.

4. **The daily program.** So that school work inside and outside of the classroom may proceed in an orderly manner a schedule should be arranged indicating the work to be done during each period of the day for each day of the week.

(*a*) *General conditions.* Before making a schedule

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of periods for the different subjects the teacher should consider (1) the physiological rhythm to which the child is subject, (2) the relative difficulty of the subjects to be presented, (3) the length of the period during which instruction in any subject is to continue, (4) the distribution of periods in a subject during the week, (5) the days of the week most favorable to work, and (6) the age and maturity of the children. Other factors to be remembered are the general effects of weather, and the rhythm of energy shown during the months. Factors such as length of school day, time allowed for each of the subjects, etc., are usually determined by the school officials.

(*b*) *Daily rhythm.* The best periods of the day for work are the former half of the morning and the latter half of the afternoon. The morning portion again is better than the afternoon portion. The best period of the day is from nine to eleven in the forenoon. The second best is after two in the afternoon. The end of the morning session and the beginning of the afternoon session are most unfavorable to heavy work.[10]

(*c*) *Relative difficulty of subjects.* The following subjects in the order given require the greatest strain, (1) exercises involving muscular effort, as, gymnastics, (2) abstract and formal subjects, as, arithmetic and grammar, and (3) thought work or memorita work. The kinds of work which require less energy are, (1) manual work, (2) oral work, and (3) work involving content and objective aspects rather than form, as geography, history, literature, etc. It is evident, (1) that

[10] See, O'Shea, M. V., *Dynamic Factors in Education*, 286, Bagley, W. C., *The Educative Progress*, 340, Marsh, H. D., 'The Diurnal Course of Efficiency,' *Arch. of Phil.*, 7.

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no subject which requires special energy and vitality should be placed at the end of the morning or at the beginning of the afternoon, and (2) that no two such subjects should be given in immediate succession.

(*d*) *Length of periods.* The length of the period of instruction should vary between fifteen minutes and an hour or more. Subjects which require less energy may be given longer periods. Forty minutes is usually considered a normal period for older children, and fifteen or twenty minutes a normal period for younger pupils. It is unwise to arrange a succession of short periods as this tends to give a choppy effect to the day's work and to cause a certain amount of restlessness. The time over forty minutes which is spent on a more difficult subject is usually wasted. The brain if active in one area for a long period becomes less and less able to retain new impressions. In manual work, however, longer periods may be given. To allow for rest and recuperation in a special field the teacher should arrange the periods so that a day elapses between two periods in the same subject. This of course is impossible when five periods in the week are devoted to a single subject. In such a case, however, the nature of the work should vary. Even in arithmetic the work may be manual one day, oral and written another. The kinds of problem given may also vary.

(*e*) *Difference in days.* Monday and Friday are not so good as the rest of the days for heavy work. Lighter subjects and subjects which require writing or other manual work may be given on such days. These days are also best suited for transcription exercises and the like. Days which immediately precede or follow holidays, etc., are not good for heavy or advanced work.

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(*f*) *Maturity of the children.* The age and maturity of the children will condition the length of the periods, the number of intermissions for physical exercise, the length of time for the recess, and the general method of instruction to be followed. There should be a fifteen minute period at about half-past ten for recess or physical exercise. There should be a two-minute 'setting-up' drill at the end of each period. In the primary grades the periods should run from fifteen minutes to half an hour for the more difficult subjects, and from an hour to an hour and a quarter in the manual subjects. In the higher grades the periods may run from forty minutes or an hour to an hour and a half or two hours. However long the period may be there should, if possible, be an alteration of manual with the more verbal kinds of work.

(*g*) *Weather influences.* In the general application of his program the teacher should consider the influence of the weather on discipline and instruction. Sultry days and hot days are unfavorable to the best work. The beginning of a snow-storm makes the children restless. Days which are cold and clear are favorable to good work. The teacher can not anticipate such days nor arrange for them in his daily program. But when an unfavorable day is at hand he should not expect rapt attention nor look for exceptional results. He should not take up advanced work if he can help it, especially if it is of a difficult character. He should put forth a little extra effort, and should give manual, written, test, or review work.[11]

(*h*) *Seasonal rhythm.* If we consider the months in

[11] On 'weather influences,' see Dexter, Edwin Grant, *Weather Influences.*

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which the best work can be done we find that a maximum efficiency may be reached during the period from December to April. The heaviest work should therefore be done during the last two months of the first school term or the first two months of the second school term. Examinations should be held as near to the close of the first term as possible. During the second term they should also be held near the close of the term, but there should be tests given in April. During the months of June, July, and August, and to a certain extent during the Spring months greater excitement is to be looked for in the children, and more numerous tendencies to irresponsible action. It seems that crimes, popular outbursts, riots, revolutions, etc., break out especially during the Spring and Summer months. This should be prepared for by the teacher and the principal. Suggestions for effective discipline have been given in the first volume. It might be well to recall that much of the impulsive action of children during these months might be directed into social, athletic, and similar channels.[12]

(*i*) *Night school.* For night school work the periods should be short. Vitality is then at a low ebb especially in the case of working boys and girls. Periods should not exceed thirty minutes. If there is but a single subject taught during the session, different aspects of it should be presented. Oral and written work should alternate, reading and discussion should precede memory work, and the like. In the evening high school a two-hour session may be broken into three periods of forty minutes each. If there is

[12] See, Hall, G. S., *Adolescence*, 2: 47, Leffingwell, Albert, *Influence of Seasons upon Conduct.*

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a one-hour, and a two-hour session for either of which pupils may register, the two periods may each be divided into a fifteen and a forty-five minute period. Instruction in drawing, designing, etc., may extend for an hour period. Intermissions may be allowed. Some schedule, however simple, should be arranged by the teacher in night school. Instruction in such schools should not become a mere time-killing device.

(*j*) *Vacation school.* In vacation schools the program is something similar to that necessary in departmental work. Special teachers are appointed for instruction in iron-work, carpentry, weaving, sewing, embroidering, cooking, history, nature study, art, kindergarten, etc. The sessions usually last three hours in the morning. In some of the subjects the boys may stay the whole morning, as in iron-work. In some the girls may take two subjects, as sewing and embroidering. A period each day or on most of the days should be taken by the children in nature study, art, and local history. These subjects will afford some relaxation from the strain of uninterrupted work in a single subject. Quiet games may be allowed for a short time each day. Free play in the yard during recess may be permitted. In practice each principal usually arranges the program best fitted to hold attendance to a certain percent of the register.

(*k*) *Recreation center.* For recreation centers and playgrounds there should also be some variety offered through change of program. Games, free play, gymnastics, etc., may alternate. Reading, club work, quiet games, etc., should be arranged if classroom facilities are present. The tendencies of the children should be closely observed and followed. It is unwise

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to force some ready-made plan upon the children especially when attendance is voluntary. If a gymnasium is open and if other work, as carpentry, games, etc., is allowed, some care is necessary for the construction of an effective program. A class should remain at games, gymnastics, etc., for a full session of one or two hours. If all the classes wish to use the gymnasium, each should be allowed to use it on certain days, and such attendance should be made to depend upon attendance in the other subjects.

(*l*) *Program of the principal.* In his own work the principal should follow a more or less regular program. He can not have one so rigid and systematic as that of the teacher. He should be open to call from any of the teachers at all times. He should be always ready to receive visitors. Unexpected incidents may take place. But underlying all his work should be a more or less connected system of routine work.

Certain fixed periods, as for opening exercises, dismissals, etc., may become more or less automatic. Other periods should be just as fixed, though within greater limits. Thus, at least once a month the principal should look over all school records. At least once a week he should make an inspection of supply closets, stairways, rooms, and the like. The various duties of cooperation in instruction and discipline should receive similar consideration. A weekly plan might be used to ensure performance of such duties. At the end of each month by looking over his work the principal should be able to satisfy himself and his superiors that he has attended to his various duties.

5. **Home work.** Home work does not consist wholly in written work. There may be quiet study or reading

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which is of far more importance than the written work. There may be construction work, as in manual training, science, etc., modeling as in geography, or practice drawing or design. There may also be free work more or less voluntary and specially fitted to the child's individual ability.

(*a*) *No new work.* In most instances none of the home work should be new to the children. In some cases it may. Thus, no problems in arithmetic, no new work in grammar, nor in general in any of the formal or abstract subjects should be assigned as home work. All such work should be in the nature of practice work. New reading matter in literature, history, or geography, or light work in drawing or construction may at times be given. On the whole, however, no work of any kind should be given to the children before some explanation and preparation have been made in the classroom. This rule should hold even for the high school.

(*b*) *Preparation by the teacher.* The kind and amount of preparation given will depend upon the nature of the subject assigned. In arithmetic no examples not fully understood by the pupils should be given for home work. Such work should be a kind of drill or review. In history or geography one or two topics with definite subtopics may be set for expansion. After the nature of the topic and the topic sentence have been explained, some short passages may be selected for topical study and construction of a topical outline. A series of questions in the nature of a test may be given. Difficult points of a lesson in literature, history, etc., should be explained. Pivotal aspects may be shown, with the method of their development. Before text-book work

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is assigned, the method of study should be indicated, and some practice in it allowed in the classroom. Thus children should read over the part selected. They should then pick out the important topics. Reading may then proceed a second time with emphasis upon such topics. The topics may then be expanded again or memorised. Study of spelling and of memory selections through the different sense appeals should be explained and practised in the classroom. In science, nature study, drawing, design, etc., preliminary instructions and practice should precede any home work assignments.

(*c*) *Sequence and correlation with class work.* The various lessons in any one subject should have a certain unity and continuity. The lessons should not only follow class work, but in themselves should form a connected, sequential whole. Often as much planning for this is necessary as for the regular class work.

(*d*) *Time necessary.* Home work should not require too much of the child's time. No work should be assigned in any of the grades below those in the last two years of the elementary school. In the seventh year, from half an hour to an hour is enough. In the eighth year, an hour or an hour and a half is plenty. In the first two years of high school from one to two hours, and in the last two years from two to two and a half hours of steady work is enough.

Much of the time needed for home work may be cut down or eliminated altogether if the pupils do such work in the school. There is no special advantage in work done at home. The main thing to be considered is the actual work accomplished. Where it is done makes little difference. The 'study' period may be

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used by the pupils to do their 'home' work, whether written or not. In fact a recent study on home work shows that such work when done in school is on the average better and more accurate than when done at home.[13]

(*e*) *Abuses.* Excessive and arbitrary impositions of home work are common abuses, but there are others. Home work is sometimes prescribed simply to give the children something to do. Again the work given one day may be made the basis of the next day's class work, that is, the work is first done by the pupils at home, and then explained by the teacher in the classroom. At times large amounts of home work are given for the purpose of driving out pupils who may be objectionable to the teacher, or of reducing the size of the class.

(*f*) *Disadvantages.* Home work which is legitimate lends itself to various objections. The children are in school five or more hours a day. It seems reasonable to suppose that if a teacher is unable properly to instruct them in this time the work can not be accomplished by the pupils at home without direction. The pupils should not do the work at home alone and then come to the school to be tested. It should be the other way round. They should do the work in the school and then be tested by their parents or by others at home.

Children should have contact with social institutions other than the school. They should be allowed to play in the open with others. They should have time for

[13] Schmidt, Friedrich, *Experimentelle Untersuchungen über die Hausaufgaben des Schulkindes*, aus dem *Archiv für die Gesamte Psychologie*, 3, 1904.

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other work, as study in foreign languages, music, etc., business, and the like. Parents may require the children for service at home. Such slight offices as running errands, writing letters, etc., are all educational in a social way. The benefits of social entertainments, parties, clubs, etc., should not be placed under a ban because of home work given by the school.

Many children have not the proper facilities for writing, drawing, constructing, or even for reading or studying. A large family, small rooms, possibly a 'boarder' or so, with 'company' from time to time are not conducive to work effectively and willingly done. It is the conscientious child who suffers most from impositions of home work. He will stay up late at night trying to solve some useless arithmetical puzzle, or to finish all the work assigned. The more unscrupulous pupil will probably not do the work at all or will wait in the morning for the paper of some other child. Often elders at home may be kept busy doing the child's work.

(*g*) *Possible advantages.* In theory home work is supposed to train the child to do his duty in an independent, straightforward way. He is supposed to develop habits of perseverance and industry. His parents, it is assumed, become interested in school work and in the sheets of written figures or words prepared by the child. But that the benefits which are supposed to result from home work are not always realised where they would do the most good will be easily seen by one who has followed the doing of home work, both in the home, and on the school stairs or elsewhere.

A possible advantage from moderate home work properly assigned is the development within the pupil

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of habits of reading and of quiet, self-sustained application. The aim in such a case is not the further perfection of school work, nor the extension of school sessions by carrying them within the home. The object is not so much the amount of work done as it is the regularity and concentration shown by the pupil. For a short time each day the child should pursue some topic, or read some subject matter. He should learn to deny himself this or that external excitation and to develop inner resources upon which he may fall later in life. This aspect of home study should be emphasised by the teacher. In general the pupil should be allowed to follow his own tendencies in the matter. A choice of work should be given and volunteer work encouraged. The systematic and heavier work should be done in the school. It is not so much the amount of home work as the regularity of the work which is effective. A few examples, regularly given, will do more good than ten or fifteen given with lapses between impositions of home work.

§ V. Discipline

1. **Opening exercises.** The aim of the opening assembly is essentially ethical. The children assemble in the main room or auditorium, listen to the principal's words, sing, recite, etc., and then march out.

(*a*) *Advantages.* The chief use of the assembly is to develop within the children a sense of social solidarity. The children act together, sing together, and move as a body. Addresses, words of advice, etc., hold equally for all. The school comes to have a meaning as a whole rather than as a collection of classes. Morality

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as applying to the larger whole is emphasised. A child who learns to cling to the landmarks of the home, the school, and the city, is well prepared to hold fast to the institutions of the country. In addition to the moral are other benefits. Children have an opportunity of reciting before a large assembly. The assembly moreover forms an excellent social background of response for special actions or work worthy of public commendation.

(*b*) *Seating.* Children may assemble as classes, or they may first be classified according to the quality of their voices. In either case arrangements should be made for orderly entrance, marching, seating, and dismissal to the classrooms. Signals should be given to indicate the formation of lines, etc., preparatory to marching into the main room. No slovenly order should be tolerated, and the whole arrangement of entrance, seating, and dismissal should be carefully worked out.

(*c*) *Time.* Assembly usually begins at nine o'clock and continues for fifteen or twenty minutes. If the assembly lasts for half an hour there should be an intermission at the end of the first fifteen minutes or so. Songs may be practised in the classrooms as part of the regular music exercises.

(*d*) *Exercises.* The assembly is usually opened with a reading of the Bible, 'without note or comment.' A few songs are sung, a few recitations are given, and the children march back to their rooms. The songs which are sung may be patriotic, folk, local, school, classic, or other songs. Some variations are advisable to break possible monotony. A scene in a play or a dramatic dialogue may be given. A folk dance may

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be given. A physical drill may take place. A class song may be rendered. A pantomime based on work done in the shop or the cooking room may be presented. Such variations will depend upon the ingenuity of principal and teachers. At least once a week the whole school should rise, salute the flag, and sing the national hymn. This exercise might appropriately close the assembly on the last school day.

(*e*) *Night school.* Time in night school is too short to spend much of it in school exercises. One night each week the whole school might assemble. Five or ten minutes each day might be devoted to classroom instruction in singing and reciting. Musical selections, debates, exhibition of work, etc., will aid in developing a school spirit. In evening high school the same holds true. Each class may become a sort of social club. A general reception and assembly might be held twice a term.

2. **School hygiene.** In this section only such school hygiene as is connected with school organisation is treated. Fuller discussion will be found in a later chapter. The general appearance of the school, inside and out, should receive the principal's systematic attention. He should see that the halls, stairs, yards, windows, etc., are kept free from marks and defacement. Rooms should be swept each day, and the halls and stairs washed down once a week. The yards, playgrounds, toilets, sinks, etc., should be similarly cared for. Ventilation, heating, and lighting should be looked after. The principal should become familiar with the machinery and apparatus in use and should see that it is kept in proper working order.

The health of the children should be attended to.

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Defects, as of sight, hearing, etc., should be noted and recorded. Parents should be persistently stimulated to take ailing children to a physician. Many individual cases may be benefited through investigation, suggestion and help of the principal. Anemic, underfed, undersized, or sickly children should be privately questioned. Their parents should be urged to take remedial measures. Improvement may be possible in home ventilation, feeding, etc.

3. **Cooperation of pupils.** The strain of discipline to which teachers are often subject has led to one or more plans by which the aid of the children is obtained. Pupil self-government, as it is called, seems to imply that each pupil is trained properly to conduct himself. On the other hand, such self-government is in practice simply the government of the pupils by some of their number. Pupil self-government in its particular signification refers to such self-control of each individual by himself that the burden of government is taken out of the teacher's hands. In its general signification pupil self-government refers to the government of the rest of the pupils by a few specially delegated to the task. This distinction should be kept in mind by one who wishes to organise a scheme of pupil self-government. It is evident that the government of some pupils by others is different from the government of each pupil by himself.

The limitations of children in this connection should be carefully considered. Younger children are too immature to fill positions of responsibility. They show a lack of restraint when enforcing orders. They lack the social experience which will enable them to judge the sanction of an act. Older pupils make better helpers,

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but they too have their limitations. They are more dictatorial. They tend to command in an arbitrary manner and to act in an overbearing way. Moreover it is reasonable to suppose that government which is a task for the teacher can hardly be placed fully into the hands of children. It is easy for a teacher to tell a pupil that he is responsible for the conduct of his fellows. But the means by which the pupil enforces his authority might not be sanctioned by high educational standards.

The nature of discipline should be understood before any power is delegated to the children. In the school the pupils should be regarded as beings who are developing, who need guidance, who can not, in fact, be judged entirely by standards outside of the school. Methods in social use are punitive rather than educative. In the school, however, an offender should be looked upon as one who is developing and who is capable of better things. The treatment which he receives should vary according to the sanction of the act, the disposition of the individual, his home training, and the like. The most delicate handling is often necessary. In many cases final judgment should be given by the principal or teacher and should not be passed by immature children. Often a pupil in authority will demand punishments which the teacher himself does not sanction in his regular class control.

Under the proper restrictions, however, pupils may be of considerable aid in governing a school. Once the children are outside of the classroom their numbers and the extent of the field which they cover renders supervision by the teachers practically impossible. In making use of the service of pupils, the principal should observe the following cautions: Pupils should be em-

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powered (1) to give signals for line formation, mass movements and exercises, for warnings to offenders, etc., (2) to ask the name of any pupil, and (3) to prevent any pupil from interfering with another. They should not be allowed (1) to lay violent hands on a pupil except when preventing violence, (2) to inflict penalties or to give punishment which is not sanctioned by the principal or teacher, and (3) to interfere with any teacher in classroom government or outside supervision.

In organising a monitor corps, patrol, school republic, etc., the principal should use the graduating or the highest class as a basis. Each pupil in the class should *ipso facto* come into possession of such privileges, powers, etc., as are granted to guards, monitors, or the like. The highest class should be a model for the others. Its members should set the standard for the others and should aid in enforcing right conduct. Performance of patrol and monitorial duties may be expected as a part of practical class work. The highest class may function as a separate body, as the House of Lords, or the Senate, for example, or they may simply form a part of the general body. Other members should be taken from the higher classes. Each class should act as a class in electing monitors or delegates to the general body. The monitors or delegates may meet and select captains, chiefs, and other officers. Courts may be established, departments formed, and an executive officer elected as in civil government. Such departments may aid in keeping the yards and playground clean, in suggesting improvements in the school, in holding trials, etc.

Patrol or monitor service should be made as attractive as possible. The excitement of an election may be

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given every month or so. Special badges should be given. Official designations, as mayor, captain, chief, consul, tribune, etc., may be employed. Entertainments may be given each month for the special benefit of the monitors. Outings, games, etc., may be arranged. The monitors may form a sort of social club with some room assigned for their use. Specific arrangements will vary according to the facilities at hand and the ability of the principal and teachers in charge.

School spirit will benefit greatly under conditions similar to those just given. The growth of such spirit, however, is an effect of a number of things. Factors other than pupil self-government operate in forming a proper spirit in the school. Anything which will make the children take an interest in the school will develop within them the proper spirit. The organisation of some form of self-government is one of the means whereby this may be effected, but not the only means.[14]

4. **Cooperation of parents.** A systematic method of enlisting the aid of parents is that of the parents' meeting. At stated periods notices are sent to the parents inviting them to meet in the assembly rooms after sessions. The meeting itself may be more or less formal or it may be informal. When the parents are together in the assembly rooms a more or less definite program should be followed. The principal or some school official should briefly welcome the parents and state the object of the meeting. A paper may be read by a specialist or by some school or other official who has

[14] See Cronson, Bernard, *Pupil Self-Government*, and Vol. I, Ch. IV, § II, 5, and for class spirit, Ch. XII, § IV, and Edson, A. W., and Stevens, E. L., 'Appendix M,' *Seventh Annual Report of the City Superintendent of Schools*, New York City, 1905.

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carefully prepared what he has to say. Such topics as home ventilation, heating, and lighting, health laws, food values, compulsory education laws, child labor, educational values of subjects, gambling, adolescence, etc., may be presented. A lecture on some popular subject with experiments, illustration by stereopticon, etc., may be given. School children may participate by acting as ushers, by reciting, singing, playing, dancing, acting, etc., as in the usual closing exercises.

With parents of some culture discussion may take place according to parliamentary rules. Suggestions may be given by parents, topics may be presented for investigation and problems may be offered for discussion. At times questions may be put to vote. After a number of meetings have taken place and after parents are more or less acquainted with one another, a more definite social organisation may be formed. In such a case the school officials should quietly step aside and work through the committees, etc., of the organisation. They should be able to enlighten the members on pedagogical matters and should arrange such features as entertainment by the pupils, distribution of circulars, etc.

In more informal manner parents may inspect work on exhibition, meet the teachers, discuss matters with them, etc. Parents may also be invited to visit the school while sessions are going on. Special preparation for this is necessary. A conference of teachers should be held so that some plan of procedure may be agreed upon. It might also be advisable to explain the purpose of such visitation to the parents in a special meeting, and set forth the manner of classroom visitation.

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CHAPTER II

CLASSIFICATION

§ I. Nature of Classification

1. **Meaning of classification.** To make mass teaching practicable the principal must separate the children into groups or classes. In such classification the principal acts directly on the children. Children of approximately like ability, temperament, character, and knowledge are placed together in one room and under one teacher. The logic and science of classification should be understood by a principal, for the classification of children should receive just as careful and rigid consideration as the classification of stones, or trees, or dogs, or what not. Bain gives as the 'golden rule' of classification the following:[1] "Of the various groupings of resembling things, preference is given to such as have in common the most numerous and the most important attributes."

From a scientific point of view, a class is a series covering a certain range, and allowing of variations from a norm or standard. If we test a class of children in one of the school subjects, the results will show variations between ten or twenty per cent and eighty or one hundred per cent. If we distribute the marks obtained,

[1] Bain, Alexander, *Logic: Deductive and Inductive*, Bk. IV, Chs. I. and III. See also, Mill, J. S., *A System of Logic*, Bk. I, Ch. VII, Jevons, W. Stanley, *The Principles of Science*, Ch. XXX.

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in order of value from one hundred down, and divide them into quarter sections, the average of the top quarter will be considerably higher than the average of the bottom quarter. These two limits will indicate the range of the class. Sextiles or other divisions may be used instead of quartiles. If all the children in the school are tested in work which all, even the lowest, can do, the results will show that the top quartile of any grade is equal in ability to the bottom quartile of a grade one or two years higher. The grades overlap. This fact should be carefully considered in problems of retardation, individual promotion, backwardness, etc. The grades indicated in the following figure were tested in simple division. Forty-five examples of the type 7)63452 were given. A time limit of fifteen minutes was set. The figures at the side indicate the number

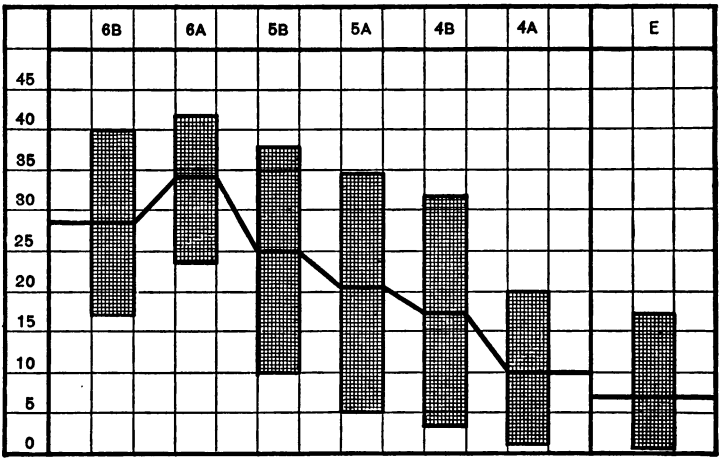

FIG. 1. Grades in arithmetic. Boys. E is class of slow children. The line running through the grades indicates the average. Top and bottom quartiles are used as class limits.

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done correctly within the time set. Other tests will yield similar results.

Children, however, are not static objects and some of the attributes common at the time of classification may change. In the course of instruction and during the growth and development of the children differences begin to appear. Some children lag behind, some forge ahead, and some may advance at approximately the same rate. Reclassification therefore becomes necessary. Promotion is such reclassification. As far as classification is concerned, if children grew and developed at the same rate, a single class could remain under a single teacher without periodic changes and promotions. Since, however, change of teachers and contact with different people is a factor in producing the differences which call for reclassification, periodic changes become necessary for educative purposes if for no other.

To prevent the disturbance of continual change and reclassification, classifications considered serially are broken by a number of stages or halting places. It is assumed that any classification made in the beginning of the term remains more or less stationary, and holds for a greater or less period of time. Such stages or halting places are called grades. A grade refers to the length of time a classification of children can remain practically unchanged. A grade is a class which is considered as a class even while it is undergoing change. Reference to grades, as first year, second year, etc., emphasises this aspect of time.

Classification, promotion, and grading are thus variations of the same thing. Classification is the grouping of children according to their essential likenesses, promotion is the reclassification necessitated by the varying

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rates of change and progress, and grading is classification extended over a more or less fixed period. What holds for classification may therefore be expected to apply to promotion and grading.

2. **Function of classification.** From the teacher's point of view, classification is necessary for effective mass teaching. Even when a teacher is in charge of 'ungraded classes' some sort of classification must exist if progress is to be made. Due to individual differences in the pupils some loss is inevitable. Classification, however, greatly reduces such loss.

From the child's point of view classification is also necessary. In the first place, the child needs the background of response suitable to his age and development. If his companions are older than he is he will tend to skip the intermediate stages of conduct and acquire habits which are not fitted to his development, which in fact may stunt his moral growth. If the child acquires the mode of conduct common to adolescents or adults he usually looks down upon conduct which really is suitable to him. This is seen in the case of children who go to work during vacation, or who work after school sessions. They acquire a cynicism, a cheap morality, and a scorn for culture which interferes with their normal moral development. They consider that much of the school instruction applies to the younger children, but not to them. Arrested development is the result. In the second place, a certain uniformity of attainments and abilities is necessary if the child is to benefit from the instruction given. If some pupils, less advanced than himself, receive the teacher's attention, he can only mark time. If some more advanced than he is set the standard, he is not in

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a position to profit by the instruction, and so loses. Since differences gradually appear reclassification or promotion becomes necessary. Promotion aims to secure the continuous development of each pupil. Classification from time to time furthers this aim, but grading tends to interfere with it.

3. **Abuses of classification.** A common abuse of classification is that arising from a lack of appreciation of the proper bases of classification. In practice there seems to be no fixed standard in any single system, or even in a district of the system, and sometimes not even in the classes of a single school. Sometimes an average in all the subjects is made the basis of promotions, sometimes the so-called essentials, sometimes only one or two subjects. Again, differences exist in the method of estimating such bases, should there be agreement in the bases themselves. Sometimes term work, sometimes final tests, sometimes the teacher's recommendation, and sometimes the *ipse dixit* of the principal based upon a test at the end of the term decides matters. These abuses may be complicated by further misconceptions. 'Classroom' is confused with 'class' as a logical distinction and then made an important factor in the determination of promotions. The principal may, in a somewhat fatalistic manner, make his promotions 'on paper' near the end of the term, distributing the pupils according to the size of the rooms of the upper grades, and without regard to the progress or abilities of the children.

In many of the elementary schools children are required to go over the work of the grade if they fail in a few subjects. In the high school promotion by subjects does away with this evil. The great disadvantage

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of classification in all its forms, however, is the mass movement involved and the uniformity usually required. The individual differences in pupils are usually overlooked. Instruction usually aims to bring all the pupils to the same level. It should, on the contrary, recognise individual differences in the pupils and strive to attain only minimum results. Classification and instruction should not attempt to level differences, but should recognise and appreciate them within the limits of a class.

§ II. Bases of Classification

1. **Classification and promotion.** In considering the grounds on which a pupil is placed in one class or the other the principal should act on reasons the same for admission, promotion, etc. In the usual course of school routine a pupil who enters as a new scholar comes from a school in which he has already been classified. Should he come from another city or from a private school in which the course of study is somewhat different the principal may classify the child in the manner which he follows in the ordinary course of promotion.

In classification the problem is how to group pupils of similar attainments, talents, and character. In promotion reclassification is necessary because of the differences which appear. It is reasonable to suppose that if any bases are used for the purpose of classifying children in the school, the same bases should be employed for promotion. Usually it is the promotion alone which determines what classification should hold for the term ensuing. Sometimes a new classifi-

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cation may be needed to readjust matters and to break into a routine which is found to be pernicious. In either case the principal should have the same grounds for his action.

2. **Theory of averages.** A simple scheme of determining the fitness of a boy for a class is to take an average of the marks which he has obtained in the different subjects. If he 'passes' he is considered fit and placed in a higher grade. Suppose, for example, we have five pupils, *A*, *B*, *C*, etc. If we take an average of their marks, we may have results somewhat as follows:

Pupil	*A*	*B*	*C*	*D*	*E*	Ave.
Arithmetic	.80	.40	.40	.40	.90	.58
Grammar	.75	.50	.40	.40	.60	.53
English	.60	.60	.50	.50	.50	.54
Science, geog., etc. . .	.50	.75	.90	.60	.40	.63
Drawing	.40	.80	.60	.90	.40	.62
Average	.70	.70	.56	.56	.56	

If .60 is the passing mark, *A* and *B* would be considered as fit for a higher class, and *C*, *D*, and *E* as unfit. At the end of the term the former would be promoted and the latter left back.

Various other factors enter to complicate the matter. Thus, the relative value of the studies, the work which the marks value, as term work, examination work, etc., may also be considered. Here will be considered only the average, as such, without regard to the method by which it is obtained, or the apportionment of values to the different subjects. What holds in general will

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hold when applied to the various particular instances to which the average may be applied.

It is seen, in the first place, that the average shows practically nothing of the child's fitness or unfitness for a class. *A* and *B* apparently belong together. But *A* is strong in arithmetic while *B* is good in natural science and drawing. Each in his own way is good for something but this is different in each case. The two who belong to the same class are rather *A* and *E*, and *B*, *C*, and *D*. In his own field *E* even excels *A* as *D* does *B*. In the second place, the average gives no indication of differences within any group. If we consider the average of the five pupils as a class, in each subject, it is seen that the 'class' would be considered weak in arithmetic, grammar, and English, and passing fair in the other subjects.

The fallacy of the theory of averages is based on the assumption that all children are or should be alike. Another insidious view which sometimes exists is that a child should be given extra work in such subjects as he dislikes or in which he shows minimum ability. Children are therefore driven to prevent their lowering the average of the class. The fact that a single mark is given at the end of the month shows that the theory of averages has a strong hold in education. It matters not how such averages are obtained. Some basis must exist for the calculation which yields a single mark for the different subjects, as *A*, *B*, etc. If some subjects are emphasised, children good in others are neglected. If a fair apportionment of values is made, children whose good marks are swamped by other poor marks must suffer. If children are proficient in subjects not touched by the school they may, according to the school standards, be considered unfit.

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3. Theory of formal discipline.[2] According to the theory of formal discipline, power in any mental faculty is convertible within that faculty from one content to another. Thus, judgment is held to be judgment, a relation to be a relation, memory to be memory, observation to be observation, and so on, no matter what kind of knowledge is involved. Thus, drawing, or botany, or science, is said to train the power of observation; literature or spelling the memory; arithmetic or grammar the judgment, etc. One may lapse into the fallacy of formal discipline through implications arising from speech. A principal rightly may speak of the good judgment shown by a boy in his selection of material for composition. Then, giving the term universal application, he may credit the pupil with judgment in matters of which the child has little knowledge and for which he may have little capacity.

The theory of formal discipline works most insidiously in classification on the basis of what are called essentials. Its operation is further complicated by certain utilitarian values which are supposed to reside in these essentials. Reading, writing, and arithmetic, as the tools of knowledge, as the subjects alone which a child can really use, 'bread-and-butter' subjects as they are called, are on these grounds thrust into prominence as proper bases of classification and promotion. These subjects therefore require some consideration.

It is held that a child who can read, for example, holds the key to most of the subjects. Even if he knows

[2] See Hinsdale, B. A., *Studies in Education*, Ch. II, O'Shea, M.V., *Education as Adjustment*,' Ch. XIII, Thorndike, E. L., and Woodworth, R. S., *Psychological Review*, 8, 1901, Bennett, C. J. C., Formal Discipline.

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little of some subjects, he can, on this theory, study up the subject because of his ability to read. Within limits, this is true. Wherever the usual words and terms in common use are employed in a number of subjects, such subjects can be read up in a shorter time than is usually required. But science, manual work, and even literary appreciation are often wholly beyond the power of one who can read. Experimental and manual work remain untested by an examination in reading. Again, reading is a matter of specialisation as are judgment, memory, and the like. A child may like to read history and may balk at geography. He may have so little inclination or talent for geography that normal headway in it is beyond him. His ability to read as such will give no indication of this. Finally, how is the child to be classified on the basis of reading? Of a number of pupils, *A*, *B*, *C*, etc., of the same general ability in reading, *A* may be above the average in geography and science, *B* in manual work and drawing, while *C* may be ignorant of any of these. He should not be placed with either of the other two even though his English might be as good as theirs. He may, in addition, have a natural distaste for these other subjects. A test in reading would hardly determine this.

The theory of formal discipline stands out more boldly in the claims put forth on behalf of technical grammar. According to the formalists, grammar trains the reasoning faculty, or the logical faculty, both of which terms are for emphasis sometimes spelled with capitals. Pupils must *think* in analysing, classifying, etc. Grammar as an intellectual discipline, a mental gymnastic, etc., is also supposed to train the pupil to comprehend

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thought when expressed in language. It is held to aid the pupil to unlock the meaning of sentences. To continue the argument along the same lines, since Knowledge is Power, a child who knows his grammar is possessed of an executive ability, and an intellectual equipment which will enable him to control an engine, manage a business, doctor a patient, or what not. His grammar at any rate ought on this theory to gain him admission to any class in any subject.

That this is untrue can easily be shown. The claims of the absolute formalists that grammar is a means of training the judgment may hold for the field of grammar, but can evidently not hold for science, drawing, literature, etc. Modified formalism goes almost as far astray. Grammar has very little to do with meaning as such. It is concerned with terminology and classification. I may be able to analyse a sentence and to parse every word in it and still be unable to tell what it means. For example, the sentence,

If three mutually perpendicular vectors be drawn from a point to a plane, the sum of the reciprocals of the squares of their lengths is independent of their directions,[3]

presents no great grammatical difficulty. The form of the sentence, the syntax of the different words, the terms by which the parts of the sentence are called, etc., give me no clue to its meaning. So too, in the sentence,

Unter den Abzählungsmethoden ist nun die Methode der mittleren Fehler in ihrem Ausgangspunkte den Abstufungsmethoden, und zwar speciall der Methode der Minimaländerungen am nächsten verwandt,[4]

[3] Kelland, P., and Tait, P. G., *Introduction to Quaternions*, 172.

[4] Wundt, Wilhelm, *Grundzüge der Physiologischen Psychologie*, 1: 472. See Goldwasser, I. E., *English and the Teaching of English*, for a good view of the matter.

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does it help the average reader to understand the meaning of the sentence, if he is told that *Methode* is the subject noun and *ist verwandt* the predicate verb, or if he is given the parsing of each word? In many instances the teacher's own knowledge of grammar is so limited that a new terminology will cause confusion. In such cases the power is not convertible within its own field. Thus, one who is used to the terms 'participle,' 'object,' 'attribute,' etc., may be nonplussed by 'gerunds,' 'verbals,' 'complements,' 'supplements,' and the like.

Arithmetic has a hold in classroom practice more powerful than that of grammar. Arithmetic, however, trains the judgment in general no more than does grammar. Many of the problems which are given are simply puzzles, or examples which belong to the sphere of algebra. Children who have the knack of solving such puzzles may do little real work during the term and still pass well when examined in the 'essentials.'

From the disciplinary side, too, it is evident that the three R's tell us little for purposes of classification. For example, suppose that of three children, *A*, *B*, and *C*, each passes well in arithmetic, reading, and grammar, and that each of two others *D* and *E* fails in one or two of the 'essentials.' Should *A*, *B*, and *C* be classed as members alike in everything else? Should *D* and *E* be classed as unfit in everything else? Will *A's* excellence in arithmetic tell us how he will do in history or geography? Does *D's* lack of proficiency in grammar indicate ignorance in science or lack of ability in written or manual work? In fact does a test in the so-called essentials give a clue to any part of the

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child's knowledge or ability in fields other than those tested?

If the value of the 'essentials' as a formal discipline is purely chimerical, their utility value must also be more or less mythical. If the knack of parsing or the trick of recognising parts of speech indicates merely a schoolboy's knowledge of grammar, if the art of solving arithmetical puzzles shows an ability in a restricted portion of arithmetic, then the utility value of these subjects must be limited to the subjects themselves. For the arithmetic used in business may be narrowed down to a very small portion of what is taught in the schools. Moreover, the pretty puzzles given in school have little application in real life. Farmer Jones, for example, will go through the prosaic process of counting his peach trees. He will not bother with calculating how many peach trees are in his orchard if they are half as many as the apple trees and a quarter more, etc. Such problems may give skill in ordinary number work or facility in solving equations, but these are restricted powers. Much of the arithmetic given in the elementary school belongs to special schools. One who is preparing for the position of engineer requires a training in mathematics of the equational variety. One who is going into business requires a mathematics of an entirely different order. Within the one field special powers must be developed. Ability in business arithmetic will hold in the field of algebraic arithmetic only where the two coincide.

From the practical point of view much of the grammar is also of little worth. A great deal of the terminology and most of the parsing are of little use in actual speech.

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A pupil may, for example, be able to parse 'should' correctly and still be unable to use it properly. Children of foreign-born parents may show the greatest ability in parsing, analysing, etc., and still speak atrociously. Nor does grammar aid meaning as such. Certain relations of thought and of form should be understood but these should not be submerged by a mass of logical terminology. Many of the classifications and verbal distinctions in grammar should be studied only by those who wish later to specialise in languages. A study of Anglo-Saxon, of historical grammar, of philology, etc., is of the same nature as that of grammar, and in fact could easily be substituted for it.

Even reading is useful only in a somewhat restricted sphere. Ability to read does not ensure study in any subject which the child is able to read. A child who may like to read history may detest geography. Under proper instruction in geography his latent talents may be brought forth. But his reading as such will not effect this. Reading in geographical topics will be necessary. To take an extreme case, the boy who reads trashy stories is not reading matter of much good. Special training in reading matter of a certain kind is often necessary before one can say that reading in such special subject is possible.

No one can deny that a thorough knowledge of the three R's is absolutely necessary. Such a knowledge, however, includes only the simplest basic elements in the four rules in arithmetic, simple fractions and decimals, writing, reading, and a more or less fluent use of language. It does not include complicated problems or pretty arithmetical puzzles, logical termi-

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nology in grammar, or fancy tests in spelling. By 'the essentials' is meant basic elements in all subjects rather than amplified matter in a few.

4. **Examination *versus* term work.** In term work there are two aspects to be considered, (1) the actual work done by a child during the term, and (2) the number of terms or the length of time he has been attending school. Each should receive consideration in classification. It is reasonable to suppose that any child who has done good work during the term and who has faithfully completed such tasks as have been assigned is fit for a higher class at the end of the term. It seems just as reasonable to suppose that a pupil who has done little during the term and who has failed to respond to the best positive incentives is unfit for a higher grade. If such term work includes periodic tests by the teacher and sporadic tests by the principal the above conditions seem especially reasonable. If, under the first-mentioned conditions, a child fails to pass a final test the result may be due to the kind of test given or to the term work of the teacher. In either case the child should not be made to suffer. The final test may be set to trap the children, it may be based on formal or technical subjects, it may be given on matter not touched upon during the term, and so may not be a fair test of what the children have done.

The length of time a pupil has been at school should also be an important factor in classification. If the school does its work, the pupil can not fail to receive some benefit. All children do not of course progress at the same rate nor do they get all knowledge or information which is given by the school. This is not to be expected. The greatest possible differences exist

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among the pupils even in schools which are rigidly graded. The most which a school can certify is either that the pupils have attended for at least eight years and have done a minimum amount of work, or that they have done the work mapped out for an eight years' course. If a child then has been at school for six years the benefit of such attendance should be assumed by the principal. If the child is a new scholar he should be placed in the grade which follows the one which he has just completed. There will be time enough to hold him back if he fails to do the work. He should not, however, be discouraged by being placed a grade or two lower at the start. So too, a principal should consider the number of times a pupil has been in one grade. If there seems to be any possibility that a boy will do better work in a higher grade, and if he has already gone through a lower grade twice or more times, he should be tried in the higher grade.

The examination requires a certain power of concentration and organisation which is not demanded in the usual course of instruction. It should therefore be given some consideration. It should act, however, as a means of rectifying possible errors or misconceptions of the teacher and of selecting one or two children who may be far enough ahead of their fellows to do the work of a higher grade.

In the elementary school, therefore, the work done by the pupils during the term should be the basis of promotion. For new admittances the number of years they have attended school should also be considered. The test should be used as a last means of deciding whether or not boys who apparently have not done the term's work are fit for advancement. It may also

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be used to determine which pupils are fitted for special advance or individual promotion. In the high school the examination should likewise take a subordinate place in promotion. At the most, the term mark should be averaged with the examination mark. It is the steady, conscientious workers who are wanted in the world and who should be encouraged. It is they who make progress possible. A person may overshadow them by brilliant flashes at times and on the whole be a social shadow.

5. **Maximum and minimum requirements.** Certain questions have thus far remained unanswered. What are the proper bases of classification? How can the children best be classified according to their ability, attainments, and character? The following is a positive treatment of the matter.

(*a*) *General conditions.* In the first place, it is evident that all the pupils can not be brought to the same standard of proficiency in all the subjects. In the second place, it is evident that certain attainments are required by society no matter what the inclinations of an individual may be. A person, for example, must be able to read and write properly, he must know how to conduct himself according to social standards, he must have some understanding of scientific truths, etc. Such requirements, however, are comparatively moderate. Often they demand simply a speaking knowledge, often an understanding without the ability to work in the field understood. In the third place, it will be found that the children vary. Some will be found to excel in one subject or group of subjects, others in another.

In the world outside, where natural conditions are

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not dwarfed and twisted by medieval practices, we find conditions similar to those just given. Society asks simply that an individual be good for something, for something of social worth. If he excels in some particular field any peculiarities, eccentricities, or even defects will be readily overlooked. It is the good-for-nothing, the tramp, and the vagabond who are thrown to one side. Provided an individual is good for something, any other attainments which he has may be of minimum degree.

(*b*) *Minimum requirements.* A minimum standard should be set for all the pupils in any class. Such a standard may be (1) a very low rating in the work as usually given, or better (2) a passing mark in work of a simple character. In the usual course of instruction the teacher gives work of certain difficulty and seeks to bring all the pupils up to a certain average. The futility of this has been shown. If individual differences in the children are to be recognised only a minimum standard can be set for the class as a whole. Higher marks should be expected in one or two of the subjects or groups of subjects in the case of the individual, but such a maximum should not be imposed on the class as a whole.

It is held that the course of study as laid out is of minimum difficulty. The general nature of the usual course of study, however, allows of so many interpretations that all possible standards between minimum and maximum can be set. In arithmetic, for example, the course of study may require as a topic to be taught, 'profit and loss.' Now what is the minimum or any other requirement indicated by such a topic? Examples in profit and loss may vary from the simplest to

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the most difficult. We may have any of the following, or others.

(1) Selling price, $360, Gain .25. Cost?
(2) Selling price, $360, Gain .135. Cost?
(3) How shall you mark goods costing $360 that you may fall .10 and still make .10?
(4) Bought 150 cases and sold one-third for $4.50 each, losing .10. The rest I sold at a gain of .06. Gain or loss and how much?

In the cases just given, the minimum requirement is the simplest example, the first of the above problems. In grammar, likewise, the course of study may call for instruction in the analysis of 'easy simple sentences of all kinds.' Now, a principal may consider as 'easy' any of the following sentences:

(1) Washington captured the Hessians.
(2) There was no one like him.
(3) Full many a gem of purest ray serene
The dark unfathomed caves of ocean bear.
(4) Thus was I, sleeping, by a brother's hand
Of life, of crown, of queen, at once dispatch'd.
(5) Fear it, Ophelia, my dear sister,
And keep you in the rear of your affection,
Out of the shot and danger of desire.

The first sentence covers the requirements as does the last. Even when specific elements are stated, as the kind of phrase to be taught, etc., these may be so combined as to produce sentences of all degrees of difficulty. Minimum requirements in any subject are such as can be covered by the general topic given. Minimum requirements are the simplest to which can be given the name prescribed in the course of study. Thus, in division of fractions, $\frac{1}{2} \div \frac{1}{3}$ can be considered a minimum requirement inasmuch as it can be called an

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example in division of fractions. In grammar, if the course of study calls for analysis of complex sentences, the sentence, 'Comrades, leave me here a little, while as yet 'tis early morn,' may be considered as filling all requirements of minimum character, since it may be classed under the given topic. The same is true of the other subjects. In geography, for example, a knowledge of the principal rivers of a country would require, as a minimum requirement, a knowledge of two or three large rivers, without the branches.

Of pupils who show no special aptitude for a subject only minimum requirements should be demanded. If a pupil can do good work in a subject or a group of subjects, and seems unable to make equal headway in other subjects, a minimum in the other subjects should be accepted. The teacher should, of course, strive to make the pupil as proficient as possible in all the subjects, but he should not plague the children for the purpose of securing high class averages in all the subjects. The standard of minimum requirements may be either a passing mark on work of minimum difficulty, or a very low mark in the regular work. Thus, if minimum work is given or if a test with questions of minimum difficulty is set, many of the children should pass with one hundred per cent, and the rest with sixty per cent or over. As the difficulty of the questions increases the marks will decrease rapidly in the case of pupils with no special aptitude for the subject. A few of the best pupils in the subject may still receive a perfect mark. A number will pass fairly well. Those capable only of minimum work may fall as low as twenty, thirty, or forty per cent, if the work is of some difficulty. Those who get sixty per cent or over are

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evidently of a different class in the subject than those who receive very low marks.

(*c*) *Maximum requirements.* The maximum requirements are usually set by the pupils of the class who show a special ability in the subject taught. In most classes a large number of pupils will be found especially proficient in one or more of the subjects of instruction. On a test of the usual kind their per cents will range from sixty or seventy to eighty or ninety. In regular class work they grasp explanations, etc., readily, and progress at a satisfying rate. Too often the teacher expects such ability in any subject of all the pupils. This is impossible from the nature of the pupils and the individual differences which exist among them.

(*d*) *Individual differences.* In any class it will be found that groups of pupils will differ in attainment and ability. Some will be good in one branch, others in another. Very seldom will a pupil be good for nothing. Thus, some pupils will show special proficiency in arithmetic, some in grammar, some in drawing and manual work, some in English, some in history, etc. A peculiar thing is that pupils may differ in aspects of the same subject. Thus, in English, a child may be good in grammar and bad in spelling, or good in composition and general English but bad in grammar. So too, in arithmetic, a pupil may be good in multiplication and bad in division. There may be differences, too, in oral and written work, though such differences may, by proper instruction, be greatly reduced.

It is somewhat difficult to group subjects in such a way as to correspond to the individual differences in

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children. Such groups as the following may be formed, (1) English, including oral English, composition, spelling, reading, etc., (2) history, geography, and science, (3) drawing and manual work, (4) arithmetic and grammar, and (5) written work in general. From the standpoint of subject matter grammar belongs to English. From the standpoint of individual differences this will not always be found to be so. Two general groups may be made, (1) drawing, manual work, science, geography, and written work, and (2) English, (including everything), history, and arithmetic. If three groups are possible, we may have (1) English, (including everything), and history, (2) science, geography, and arithmetic, and (3) drawing, manual work, and written work, or (1) English, (excluding grammar), history, and written work, (2) geography, science, drawing and manual work, and (3) arithmetic and grammar.

No fixed rule for grouping, however, can be given. The classification of pupils, like the classification of anything else, depends upon the particular instances under consideration. If a pupil is to be classified he should be tested in all the subjects taught in the class. He should be given a minimum test or a series of tests in each subject. If he does only medium work in some subjects, and excellent work in others, the special group or class to which he should be assigned may easily be determined. The questions should be partly oral and partly written. In promotion the same basis of classification should be followed. Term work should count the most. In such term work the pupil should be rated according to his maximum and his minimum subjects. If tests are given, minimum tests should be given first. Then a maximum test may be given if

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there is any doubt as to the subjects in which the individual pupils are strong. So long as a pupil shows special ability in one or more subjects and only minimum ability in the others he should be advanced. So too, if he shows but a little more than minimum ability in all the subjects he should be advanced at the end of the term.

(*e*) *Possible objections.* It might be objected that a plan of maximum and minimum requirements is one of specialisation which has no place in the elementary school. But it is seen that a minimum standard is required in all the subjects. This, from the routine point of view, is somewhat low. As a matter of fact, however, though a mass of material is forced upon the children, even minimum results in all the subjects are not always obtained. The elaborate courses of study in which the teacher expects the pupil to be equally proficient reminds one of Johnson's criticism of Milton's scheme of studies.

> It is told that in the art of education he performed wonders; and a formidable list is given of the authors, Greek and Latin, that were read in Aldersgate Street, by youth between ten and fifteen or sixteen years of age. Those who tell or who receive these stories should consider that nobody can be taught faster than he can learn. The speed of the horseman must be limited by the power of his horse.[5]

So much is attempted with children in the course of instruction that the resulting confusion prevents them from knowing some of the simplest things. It is better for the children to learn simple and basic truths in all the subjects than to flounder through a mass of detail which in the end is forgotten, or perhaps never fully

[5] Johnson, Samuel, *Lives of the Most Eminent English Poets*, 'Milton.'

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understood and learned. The cry for the 'essentials' refers rather to such basic truths in all the subjects than to only a few formal subjects.

If 'specialisation' refers to the individual differences of children, then the child is practically a specialist as soon as he is born. A theorist may speak of the fully developed man, and of a complete and rounded education. There are limits, however, beyond which the child can not be brought. It is much better then that the pupil be given minimum work in all the subjects and so be allowed to attend all the grades in school, than to be prematurely forced into the street because he is unable to meet the rigid requirements set for all. Thus, in one grade a child may be able to do simple problems in fractions and may fail with more difficult examples. If he is held back on this account he loses the opportunity of learning simple decimals in the next grade. The same is true of the other subjects.

It might be said that minimum requirements would make school work too 'easy.' If so, so much the better. Much of the worry and strain which tends to harden the teacher is due to his attempt to level individual differences, to force a mass of detail upon children who are unable to assimilate it, to carry out instructions, which, from the nature of the case, are impossible.

(*f*) *Conduct.* Where there is no specific course of study in conduct, it should not be considered in any basis of classification as far as knowledge is concerned, though it must be considered as far as special classes are concerned. If there is a special course in conduct, it should be grouped with history or English. Whatever losses result from misconduct, however, should be charged against the child in the subject involved.

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In this connection, it might be well for the teacher to form a tentative promotion list at the end of the fourth month, since the pupils usually do not do their best during the last month, and since this month, because of its propinquity, is placed in the wrong perspective.

§ III. Grading and Promotion

1. **Formation of classes.** Proper classification is greatly hampered by the fact that a teacher must take a class of thirty or more children no matter whether such children are individually different or not, and that often there are no more than two teachers to a grade. An ideal condition would be one in which all the pupils of a class are good in the same subjects or groups of subjects and weak in the same subjects. Where there are three or four teachers to a grade a fairly good classification of the pupils is possible. With two teachers to a grade the grouping can not be so exact. With only one teacher groups must be formed within the single class.

(*a*) *Classification.* Where there are two or more teachers to a grade, pupils should be classed according to their minimum and maximum attainments and abilities by the means above suggested. Those good in one group, as drawing, manual work, science, and geography, should be placed in one class and under one teacher. Those showing a minimum proficiency in these subjects but good in arithmetic, English, history, etc., should be placed in another class and under another teacher. Both classes of the same grade should then show a minimum proficiency in all the subjects, but the individual differences should be recognised by

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grouping the children according to the subjects in which they show a maximum proficiency. The class should be placed in charge of the teacher most efficient in the subjects in which the pupils show a minimum proficiency. If the teachers so desire, they may change round each term.

This system of classification can more easily be applied in the high school since the pupils come from a wider area. Very general differences are recognised. Thus, we have a high school of commerce, a high school of manual training, an academic high school, a training school for teachers, etc. Within each school, however, pupils should be classified according to maximum and minimum requirements in the different subjects. Classification in alphabetical order is convenient for purposes of statistics, but it should not be used as a basis for the formation of 'classes.' Such a process reminds one of the classification of inmates of a reform school of all degrees of depravity according to sizes, 'four feet, four feet seven, and over four feet seven.' [6]

If there is only one teacher to a grade the teacher should recognise the individual differences of children by forming groups. Such groups may be indicated only on paper. This will simplify the work of the teacher by indicating the pupils on whom effort in certain subjects would be wasted. Pupils, moreover, will find their school life more agreeable if they are not tormented by the attempts of the teacher to lift them beyond their depth. The method of group instruction has been discussed in a preceding section.

(*b*) *Grading.* After a class has been formed there

[6] Riis, Jacob A., *The Making of an American*, 366.

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still remain the questions (1) how long the child is to stay in the class, and (2) how long he should stay with a single teacher. Since children grow and change rapidly, and since reclassification becomes necessary at the end of a comparatively short period, it seems advisable to make the school term, five months. Reclassification or routine promotion at the end of that period will enable the children to move in more homogeneous groups, and it will also tend to act as a stimulus to continued effort. If a child is held over, he will lose only five months by such grading.

Though the term should be only five months, the children, if possible, should remain under the same teacher for at least a year. Such a plan will require a rotation between the teachers of two grades. If there are three teachers to the lower, and two to the upper grade, those of the lower grade will have to take turns. If a child changes teachers every six months, the effects of the social rapport which has been developed will be lost, and the new teacher will have to start and develop a bond of sympathy anew. If the teacher is in charge for a full year, he carries his influence with him. Waste of effort through too frequent readjustments between teacher and pupils is thus avoided. Much duplicate clerical work becomes unnecessary. Whatever influence the teacher has will likewise be carried over into the higher grade. If the grades were of a year's duration the children would be under the same teacher for a year. But because of the lack of reclassification the teacher would have to carry along a number of pupils who are not able to do the advanced work towards the end of the year. Moreover, with grades a year apart, the pupil would lose a year whether held over at the

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end of the term, or put back at the middle of the term.

High school pupils are more advanced and can better stand the strain of continuous application for a year before promotion takes place. The departmental method of instruction, while affording variety and change, also allows the teacher to have the same pupils under his charge for several consecutive terms. The method of promoting by subjects also does away with excessive loss through failure in promotion. Even in the high school, however, it seems that more good would result if the promotions were semiannual.

2. **Routine promotion.** The bases of classification and promotion have thus far been discussed. There still remain to be considered how such bases are to be employed, and the method to be used in the promotion of pupils from one grade to another.

(*a*) *Rating.* At the end of each month each pupil should receive his mark in each of at least four or five groups of subjects. In addition to the regular class work and tests, an examination may be given once every month or so. On such a test minimum questions may be set. Two tests might be given, one minimum and one maximum. If the pupil is badly deficient in one or more subjects, this should be noted on his report card. At least a month before the term closes, the teacher should make out the promotion list.

(*b*) *Progress of the pupils.* The principal should actively coöperate with the teacher in determining the progress which the pupils are making. As the principal has charge of a greater number of children, his more impersonal view of a child's attainments and ability will do much to correct bias and favoritism of

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the teacher, should any be present. By looking at the marks posted in the teacher's room or by examining the child's report card, the principal can obtain a general idea of his progress. By visiting the room from time to time, and giving a lesson now and then, some pupils will stand out as exceptionally bright, or as exceptionally stupid. Systematic tests during the term, however, are necessary if the principal wishes to form his own judgment of a child's progress. In addition, the principal may examine the written and the constructive work done during the month.

Tests should be given by the principal each month or so. They may be scattered over the different subjects, a test in one subject being given one week, a test in another, another week. The marks obtained by the pupils in the principal's tests should be kept separate from the marks given by the teacher. Such tests should be used to safeguard a child's right of promotion. If a child shows up well in both the principal's tests and the teacher's ratings, there can be little question of his proficiency. If a child fails in the principal's tests but has good marks from the teacher, the teacher's ratings should be followed. If the child passes well in the principal's tests but shows up badly in the teacher's record, he is the child to be immediately looked after by both principal and teacher. A principal should therefore hold his tests early in the second month of the term so that such pupils can be tended to before further harm comes to them. If the tests are held near the close of the term it may then be too late to aid the pupils concerned.

Such pupils as show up well in the principal's tests but poorly in the teacher's ratings should be called

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outside by the principal and given advice and encouragement. The teacher and the principal may discuss their cases. Any pupil who shows proficiency in most of the subjects should not be held over nor hindered by bias, dislike, inattention, or what not on the part of the teacher. If the principal thinks it advisable, he should also call out pupils who have done good class work but who have failed badly in his tests. A few questions will show the reasons for such failure. If the teacher is at fault, the principal should cooperate in the manner suggested in the first volume. The child, however, should not be allowed to suffer.

The children who should be considered unfit for advance at the end of the term are those who have failed both in term work and in the various tests given by the principal during the term. If, however, there are reasonable grounds for promoting a child he should be advanced. If he has lost time through sickness, home troubles, or what not, and if his work while he was at school has been good he should be advanced. If a child's backwardness seems to be due to the changes of adolescence he should be tried for a time in a higher grade. If a pupil has been admitted to the class in the middle of the term, or even during the last month or so, his apparent backwardness should not result in his detention in the same grade for another term. He should be given an opportunity of fitting himself to the new conditions and should be promoted with the rest. The common practice of holding a boy over in the same grade simply because he is a new scholar should not be tolerated. If a pupil is much older than the rest of the children, and if he is otherwise unobjectionable, he should be allowed to get what he can in

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the next higher grade, provided his promotion will not interfere with the promotion of brighter pupils. The aim to be kept in mind in promotion, is the continuous development of each pupil in the school. If such development is furthered by promotion, the child should be promoted. With minimum requirements the teacher need not strain to bring such pupils to a high average in the different subjects.

(*c*) *Promotion not selection.* In many schools a wrong notion seems to guide both principal and teachers in the matter of promotion. Children are regarded as 'fit' or 'unfit' for a higher class. Those 'fit' are to be selected and those 'unfit' are to be rejected. The school is thus considered as an institution which is to aid in the beneficent process of selection. The 'survival of the fittest' then becomes a catchword which can result only in widespread harm to the children. It requires little reflection to see that the school, instead of being an instrument of selection, is rather a means by which the process of selection is to be held off till the child can be better prepared to withstand the various tests of selection. It is just for those children who can least stand rigid tests that the school should provide means of holding their own. If the school existed only for children of natural ability and power the reasons for its existence would be few. For such children have least need of the school. But the children of the ignorant poor, the children of foreign parents, the children of less than average ability, the weak, and the underfed, these are the ones who should be kept in school as long as possible, who should be protected against the premature and harsh action of selection. If therefore a pupil will stay at school

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another term because of his promotion, he can not fail to get something from his continued stay at school.

So long as a pupil is good for something, so long as he shows more than minimum proficiency in one or more subjects, so long as he is not practically worthless, he should be promoted. If he shows a minimum proficiency in almost all of the subjects as measured by minimum requirements or by low ratings in tests and work of average difficulty, he should be promoted. Essential truths in all the subjects should be the basis. Such truths should be simple and basic. Detail should be required only of those pupils proficient in some special group of subjects.

(*d*) *Mechanics of promotion.* Near the end of the term the teacher should send out a list of the pupils who do not deserve promotion. In such list should be the names of the pupils, the ratings in the school subjects, and whatever notes or comments are necessary. The principal should compare this list with his own list. He should discuss the merits of each case with the teacher. Then during the last month he should finally question the children concerned, in the classroom, and if necessary, in his office. If they do not seem able to grasp most of the subjects, if written tests of minimum difficulty show weaknesses in most of the subjects, the pupils should be held over in the same grade.

On the last day of the term, at the end of the morning session, the teacher should read off the names of the pupils who are held over. He should tell them at what room to report and dismiss them. The names of the pupils to be promoted should also be read, and these should be directed to what rooms and teachers to

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report in the afternoon. If all the lists have been arranged, the teacher has only to read off the names. He should then send the lists to the teachers to whom the pupils are to go. Each teacher will then have the necessary data for his new class.

(*e*) *Putting back.* For a number of reasons the putting back of a boy after he has been promoted is a most questionable process. It should be remembered that the teacher in the lower grade has difficulties of his own to contend with. His pupils are more immature and often more numerous. He has enough to do to look after his own 'bad' boys. A teacher should also keep in mind the fact that if he puts a boy back into the lower grade, he will probably have him again the following term. A pupil may be humiliated by being put back but he can hardly be said to receive any benefit. If he is old enough, he may leave school altogether. A thorough investigation should therefore be made by the principal before he consents to the putting back of a pupil. He should look up his record, test him thoroughly in all the school subjects, try him with another teacher in the same grade, consult with the child's parents, and finally give notice to the superintendent in charge of the district. Teachers should be cautioned against making excessive threats in this connection, since the teacher and not the pupil may in the end be humiliated.

3. **Individual promotion.** For some pupils routine promotion may be too slow. A pupil who has entered school at a late age may try to make up what he has lost through late admission to the school, sickness, or what not. A foreign-born child who has been graded low because of his inability to speak and write the lan-

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guage may be able to do advanced work upon fuller control of the English language. Then, too, ambitious pupils, children to whom the possibility of more rapid advance will act as a spur, or pupils who are above the average in intelligence, ability, and vigor, may be hindered by routine promotion every half year.

If such children pass the required tests they may be more rapidly advanced in either of two ways. They may do extra work during the term and at the end of the term they may skip a grade. Or they may be selected early in the term and promoted at the end of the second month. In such a case there should be some means by which a junction between the work of the two grades may be effected. There should be a review of all the grade work at the beginning of the third month so that the pupils newly promoted will have an opportunity of learning some of the advance work. By means of group instruction such pupils may receive the help which they need. In addition, before or after sessions the teacher should help them in such detail as they do not fully understand. Since the pupils individually promoted are intelligent and ambitious they will rapidly catch up with the rest of the pupils in the new class. Some time should be given to such pupils that they may adjust themselves to their new surroundings. A fair judgment can hardly be passed on their work as soon as they are promoted.

If individual promotions are made they should be made in a systematic manner throughout the school. If boys are advanced more rapidly out of one class and this class does not receive similar additions from below, it will be weakened for the rest of the term. The principal should cooperate with the teacher in

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selecting the children who are to be individually promoted. From the results of his tests and class visits he can form some notion of the children who do better work than the rest. Since in this case it is a matter of individual selection and not of routine promotion, the results of the principal's tests should receive as much weight as the ratings of the teacher.

The extra work for the children who are seeking individual promotion should be of advanced grade but only of minimum difficulty. In the review work taken up at the beginning of the third month minimum and basic work should likewise be taken up. With a minimum foundation of advanced work a bright child will have little difficulty in making further headway. All the subjects should be made the basis of individual promotion. The same principles which apply to routine promotion should hold for individual promotion.

§ IV. The Examination [7]

1. **Meaning of examination.** The examination is a two-sided process, in which one sets questions for another to answer. From the nature of the case the one who sets the questions should not give any aid to the one who is supposed to answer them. He should not indicate nor suggest anything by look or attitude. He should not read into the questions any information which he possesses. The one who is being examined is supposed to write what he knows and omissions

[7] On 'examinations' see Latham, Henry, *On the Action of Examinations*, Bain, Alexander, *Dissertations on Leading Philosophical Topics*, 268–277, Hadley, Arthur Twining, *The Education of the American Citizen*, 191–210.

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must be considered as ignorance. Besides the setting of questions and the answering of them, there is involved in the examination the marking of the answers according to a certain standard. The constantly changing criterion in the oral examination is one of the disadvantages of that form of test.

The examination deals with theory and practice only and not with feeling, emotion, character, or conduct. It is concerned with intellect and action which may be tested within a short time and which in part may be expressed in the form of judgments. Feeling and character can not be so tested. A longer time is necessary to do this and the logical form is useless as a test. In this connection one can not help recalling the results of Lear's examination of his daughters and his judgment of Cordelia.

A distinction is sometimes made between an examination and a test. An examination covers a subject more thoroughly than does a test. Its questions are usually more searching and the subject matter involved is usually more extensive and complete. A test is more superficial and restricted. It does not presuppose any special preparation or any thorough or extensive knowledge. The organisation of knowledge necessary for an examination is not always required for a test. In essence, however, the examination and the test are the same. An examination or test may be oral or written. In the former case we may have the more thorough quiz or the running fire of question and answer. The term 'examination' may be considered as the generic term.

2. **Function of examinations.** The purpose of an examination may be either (1) to select, or (2) to edu-

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cate and stimulate. The former use is the exception. The latter is the one which should be most often kept in mind by the teacher.

(*a*) *Selection.* For public service, for fellowships at universities, for positions in business, etc., it behooves the one who is to pay the salary, prize, or allowance of the successful candidate to select the best person for the position. Of a number of applicants, one is selected, and the rest rejected. By a false analogy, the principal may compare himself to the examining board, the pupils to the applicants, and the higher grade to the position offered. An examination in such a case is given for the purpose of selecting the pupils who are 'fit' for promotion. This analogy is often strongly believed in where the teachers themselves have been selected by competitive examination.

In the first place, it is evident that the school is not so much for the fit as for the unfit, and that the more unfit individuals there are, the more numerous should be the schools. In the second place, the schools and the classrooms are not so much prizes to be won by the few through competitive examination as free gifts to be forced if necessary upon every child. In the third place, it is the weak and the unfit whom the school should receive and aid. In business, in civil service, etc., the weak are thrust aside and stamped 'unfit.' In the school, however, it is just these who should be coaxed within its walls and given a taste of everything which the school has to offer. Finally, civil service and other selective competitions presuppose that the individual has finished his education and has acquired a certain proficiency in his specialty which is to be tested. The school, however, deals with a

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growing and developing child who is not to be checked or rejected, but who is to be aided and encouraged in every way.

(*b*) *Education.* The second use of the examination is purely educative. Its purpose is on the one hand, (1) to develop within the child an ability to organise knowledge within a special field, (2) to show him his strength and his weakness in a subject, (3) to give him increased control over the subject through orderly expression, and (4) to give him a task which demands more than ordinary concentration and energy. On the other hand, the purpose of the examination is (1) to give the teacher some indication of the results of his instruction, (2) to correct his general opinion of the pupils by showing him exactly what has been accomplished by them, (3) to give him a basis for estimating the abilities and attainments of the children in the various fields, and (4) to enable him to train the pupils in answering examination questions, and in meeting rigid tests. As far as the principal is concerned the use of the examination is (1) to correct possible bias and misconception of pupils by the teacher, (2) to stimulate the pupils and enforce the instruction given by the teacher, (3) to enable him to judge the results of the teacher's instruction, and (4) to give him a basis in judging of the progress of individual pupils and in selecting pupils for individual promotion.

From the standpoint of the pupil, it is seen that the ability to do the small tasks given from day to day does not always carry with it an ability to master the entire work as a whole. The organisation and logical arrangement required for such mastery can be developed only by practice in examination. A child, moreover,

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occasionally needs a mental shaking up, as it were. He may content himself with a dim and hazy knowledge of things which should be specifically known. He may, at times, have an exaggerated idea of what he can do. An examination will quickly set him to rights. On the other hand, an examination may show to a pupil ability and control over a subject which he never suspected. Finally, the examination is a species of review, and demands a strain and a concentration which are usually not called forth in routine work. The examination may thus be considered in the light of a corrective to loose thinking and vagary.

From the point of view of the teacher, the examination is useful in showing to what extent he has been successful in his instruction, and in correcting possible bias or favoritism on his part. It also gives him a basis for rating pupils, which is the same for all. Finally, if training in the organisation of knowledge is a feature of school work, examinations must be given from time to time. In this connection, special instruction is necessary on the method of interpreting questions, answering the questions topic by topic, restricting the answer exactly to what is required, arranging the paper, and the like. Practice and drill are then necessary as in other work. Examination should be made a feature of instruction in addition to the regular class work.

From the standpoint of the principal the examination should be considered rather as an aid to the teacher than as a means of enforcing supervision or driving the teacher in instruction. If the principal and teacher agree on questions for the class, the pupils will tend to have a certain respect for work which thus has the

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support of the principal. At the same time the results of such tests will give the principal some indication of the coöperation which is necessary on his part. If the principal and teacher coöperate in this connection the examination may become one of the greatest aids of the teacher and a strong stimulus for the pupils.

3. **Setting the questions.** In setting questions one should consider (1) the persons concerned in the selection of the questions, (2) the nature of the questions, (3) the conditions under which the questions should be given, and (4) the periodicity of the tests.

(*a*) *The persons concerned.* The persons who are concerned with the class, though each in a different way, are the principal and the teacher. Neither one, therefore, should set questions without the coöperation of the other, if both are concerned in the results. Where a mutual understanding exists either may set the questions. But should the teacher wish it, the principal should allow of coöperation on the part of the teacher. The simplest way for the principal to avoid protest is to allow the teacher to select the questions. If there are two or more teachers to a grade these should agree on a set of questions. A modification of this plan is to have the teacher submit a series of questions covering the work of the grade, from which the principal may then choose. The principal may change some of the figures, and perhaps the wording, but in this he should secure the consent of the teacher. The difficulty of an example may be increased tenfold by the addition of a few simple fractions. The principal may submit questions to the teacher and combining these with the teacher's questions make his selection. In

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an open conference the questions submitted by all the teachers and the principal may be discussed.

The matter under consideration is a very common-sense one. The teacher has taught certain topics and the children are then to be tested as impartially as possible in these topics. It is seen that if the principal tests pupils in topics which have not been presented, many children may pass the principal's tests without having put forth much effort in class work, and so may look upon class work as more or less unnecessary. A general indifference to class work will gradually be developed. The teacher, too, will lose his interest in his class work if the chances are that the pupils will be examined in something else. On the other hand, pupils and teacher alike will be stimulated, if the examination is based upon the class work, and if the faithful workers succeed and the laggards fail.

If, in his questions, the teacher does not place the proper emphasis upon the topics in the various subjects the principal should use legitimate means of coöperation in instruction. He should not use the test for this purpose. If he does, he may test matter which has not been taught and so cause the results just mentioned. The questions should be restricted to the subject matter which has been taught. If the right matter has not been taught the principal should use means of coöperation other than the examination.

(*b*) *Nature of the questions.* The questions may be of minimum or of maximum difficulty depending upon the special ability of the pupils to be examined. For pupils who are to be advanced more rapidly, questions more or less difficult are in order. If the aim of the test is to show the efficiency or inefficiency of the

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teacher only minimum questions should be set. If the test is one of average difficulty, out of ten questions, for example, there should be one or two of more than average difficulty, about four of minimum difficulty, and about four of a little more than minimum difficulty. The more difficult question will bring out the brighter pupils in the subject concerned. The questions of minimum difficulty will give even the poorer pupils a reasonable chance to pass. No examination paper should consist wholly of questions of maximum difficulty.

The rhetorical qualities of the question, to use the words of Fitch, should be 'clearness, terseness, and point.' The words should be simple and clear. There should be no verbiage. If possible, the question should be so definite as to admit of but one answer. A pupil should not be hindered by the meaning of the words as such unless that is a part of the test. In arithmetic, for example, the test is one of arithmetic, and not one of English. The pupil should therefore have no difficulty in interpreting the wording of the question.

(*c*) *Conditions of the examination.* The questions should be given to the pupils under normal conditions. The morning of any of the middle three days of the week is a good time. If a test is given in the afternoon, or on a rainy or a cloudy day, low results should not be held against either the teacher or the pupils. Not more than one test should be given by the principal to a class during a single day. The teacher, too, should follow this rule, especially if the examination is to count seriously for or against a pupil's standing.

If given orally, the questions should be read slowly and clearly. They should then be read a second time.

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If the principal is giving the test, the teacher should take no part in it, even if questioned by pupils seeking information, unless requested to do so by the principal. All requests, etc., of the pupils should be referred to the principal. The principal may have the classes assemble in the main room or he may give the questions to the classes in their own rooms. He should allow about an hour or an hour and a half for a series of questions which can be done by the average pupil in about half the time. If a time limit is set, this should be announced. Time limits should occasionally be given, since an examination should test both accuracy and rapidity of work. Younger pupils should not be put to the strain of examination for so long a time.

(*d*) *Distribution of examinations.* Examinations should not be put off till the end of the term. The first test might be given at the end of the first four or six weeks. One or two subjects may then be taken up. Other subjects may be tested later. Every six or eight weeks at the most, the principal should coöperate with the teacher in examining the class. Examinations should also be held close to the end of the term so that the class work will not flag. If properly arranged such tests will not require much of the principal's time or energy. The principal and teacher can agree on the questions to be given. The principal can then either send them to the teacher or read them to the class himself. The teacher may remain in charge and the examination continue in place of the regular class work. The teacher can collect the papers, correct them or have a pupil correct them, record the marks, and send the results with the papers to the principal.

A more formal examination of all the classes may

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take place at the end of the second month. Pupils should then be examined under the eye of the principal. Such tests are necessary to correct possible variations in classroom tests given under the supervision of the teacher. Pupils who do not pass well should be looked after by both principal and teacher.

4. **Subject matter of the examination.** The subject matter of the examination may be divided into the two general branches of theory and practice. Under theory further divisions may be made. We do not have one entirely free from the other. Writing and speaking, for example, are necessary to express thought. So, too, some thought is necessary in much manual work and bodily action. But according as the one or the other predominates and gives color to the whole process, we have either theory or practice.

(*a*) *Practice.* Practical work may range from acts of habit to the most complicated constructive work. We may have writing, map drawing, wood cutting, cloth pasting, modeling, sewing, embroidering, cooking, drawing, designing, constructing, etc. The principal may give the test with or without time limits in the form of an exercise or a problem. He may set models and ask the children to draw them. He may distribute models and ask the pupils to place them and then draw them. He may set a task in modeling, map drawing, sewing, cooking, etc. Children may be given material and asked to do a certain piece of work. No help should be given by the teacher other than is necessary in the distribution of supplies. A more complicated task as one in embroidery or shop work may extend over a number of school days. In such a case the work should be collected in its unfinished state and

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returned to the pupils when they resume work. No one can do the work for them since it is manual, and any practice which they do on their own account at home should be allowed to their credit. Tests are rarely given in the practical subjects. Any neglect in this connection, however, carries with it the implication that such subjects are not of worth, that they may, in fact, be neglected. If a principal or superintendent examines only in the formal subjects or those more or less theoretical, he tends to further inefficiency in the instruction of the other subjects.

(*b*) *Theory.* Some idea of the meaning of theory of knowledge is necessary before effective tests in it can be given. The course of study may seem to require an equal degree of knowledge of all the matter presented. Overpressure is often due to a misconception of what is really required. In history, for example, what kind of knowledge does the topic, 'Magna Charta,' signify? Is the pupil simply to place the name in English history, or to give an account of its provisions, or to make comparisons between it and other state papers? In literature, does the study of the play *Julius Cæsar* require simply a recognition of it as a play with some knowledge of the plot, or a knowledge of the definitions of the words used in it, or an understanding of the plot and of the leading characters, or an ability to write a composition on the story or a critique of the characters? In science, does a knowledge of a dynamo, for example, mean that the pupil is simply to recognise it as a machine different from a printing press or other object, or to be able to give an account of its parts, construction, motive power, etc., or to be able to take it apart and make one like it? These illustrations,

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in a rough way, indicate three grades of knowledge, which may be termed (1) knowledge of recognition, (2) knowledge of recall, and (3) knowledge of construction.

(1) *Knowledge of recognition.* Knowledge of recognition is the awareness of a situation accompanied by a feeling of familiarity, rest, ease, or quiescence. It is expressed by a look, an attitude, or by some sounds or words of recognition. Much of our conversational knowledge is of this kind. So, too, is much of our knowledge of the things about us. A boy, for example, who passes along a road may see poison ivy, recognise it as such, and keep away from it. Another may not and may thereby suffer. By recognising the dangerous character of a bare electric wire an individual may save himself from serious injury. In numerous instances knowledge of recognition, while existing simply as an attitude or simple expression, may be of great biological significance.

For examination purposes the simplest expression is all that is necessary to indicate possession of such knowledge. The name, the use, the surroundings, a few qualities, some connection or association, etc., of an object or situation will show whether or not a pupil recognises it. The answer need be nothing more than a single short sentence. Much of the work laid down in a course of study requires only a knowledge of recognition. It is impossible for a pupil to remember thoroughly everything which has been taught and the teacher can not expect such a mastery on the part of the pupil. Much of the geography, history, literature, grammar, etc., should be known only in this manner.

(2) *Knowledge of recall.* Knowledge of recall is

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more rigid and determinate. Some things must be remembered in the same way and under the same conditions in which they originally existed. In knowledge of recall some stimulus or cue is given upon which the individual associates the proper ideas in the correct order and expresses them in the right way. Examples of facts to be known in this rigid and exact manner are the spelling of words, important dates in history, arithmetic tables and processes, summaries, topical outlines, beautiful passages in literature, moral truths, the general plan of making a design, recipes for cooking, and the like. In this connection two things should be noted. In the first place, the topics in each subject which should be learned 'by heart' should be definitely indicated. Too often the principal or teacher will require the children to know everything in this determinate fashion. In the second place, it is evident that knowledge of recall should be restricted to essential truths in each subject. If by the 'essentials' we mean the basic facts in every subject and not the detail of two or three formal subjects then the expression has some value in instruction. In all the subjects there should be a specific list of matter which should be the subject of knowledge of recall.

(3) *Knowledge of construction.* In knowledge of construction some original manipulation of the facts and data given is required. Such knowledge may be required under different conditions. The data may be given to the child or he may be asked to remember them. If the data are supplied, the test may call either for an analysis or a synthesis. In the former case the child may be asked to find the topic of a paragraph, to construct a topical outline of some historical

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or other matter, to select the chief parts of a narrative and arrange them in a sequence, etc. Such a test may require the use of a text-book, of a map, chart, and the like which the pupil has open before him while he is at work. With the book before him he answers what is required. In the case of synthesis, however, the child may be asked to rearrange facts which have been placed at his disposal, to connect such facts with others, to do something with the data given, etc. Thus, he may be asked to use given material and write a paragraph or a composition of his own. In such a case some topical analysis must also take place. He may be required to find the areas productive of some article as indicated in his geography, to locate some city by latitude and longitude, or he may be asked to infer possible consequences of the situations or events described or explained in his book.

When the pupil is required to supply his own facts he is given only a topic, problem, or question. This must serve as a cue to recall the necessary ideas. These ideas must then be arranged, reconstructed, and modified to suit the new conditions. Thus, the pupil may be asked to write a paragraph or so on an historical or literary event, as, Signing of the Magna Charta, The main causes of the Civil War, etc. He may be required to make comparisons, show causes or consequences, and the like.

In framing questions, therefore, the teacher or principal should consider the different kinds of knowledge which may be involved. Some of the questions may require knowledge of recognition only. Some may require a bald, verbatim statement of fact. Some may require an answer in composition form, in the form of

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a topical outline, list, table, etc. These variations are possible in both maximum and minimum requirements, and in oral and written tests.

5. **Marking the answers.**[8] The answers to the questions may be judged either by general impression or according to a system of marks. In the latter case a positive or a negative system may be employed.

(*a*) *General impression.* When a general impression of the paper as a whole is formed some such mark as *A*, *B*, *C*, etc., may be given to the whole. The paper is read over once or twice and the rating given. This method is applicable to such answers as are expressed in composition form, to penmanship, drawing, construction work, sewing, cooking, etc. To ensure a fair degree of accuracy the papers or work should be arranged in a series according to their excellence. The best half dozen or so should be made the standard and the others should be judged accordingly. Marks may then be given to each according to its place in the series. Low marks as *C* or *D* should be given only to such papers as are practically failures. The work may also be placed in one of three or four piles according to its general excellence. Back of the general impression may be some definite outline or series of points which are looked for by the one who marks. In judgment by general impression all the work should if possible be examined at one sitting. If this is not possible approximately the same conditions should be selected at each judgment of a portion of the work.

[8] On 'marking' see, Latham, Henry, *On the Action of Examinations*, Ch. IX., Eve, H. W., Sidgwick, A., Abbott, E. A., *Three Lectures on Subjects Connected with the Practice of Education*, 'On Marking,' by H. W. Eve.

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The names should not be seen when the mark is being given. General impression is an extremely variable quantity and may be raised or lowered to an alarming degree by the time of day when the marks are being given and also by personal bias. In fact the general impression which forms the basis of oral examinations in civil service is a loophole through which may creep illegitimate influences of all kinds.

(*b*) *Positive marking.* This form of marking is usually employed in judgments of arithmetic, geography, history, and similar subjects. A standard mark is given to each question and the answers rated accordingly. All the marks are commonly based on a maximum of 100, though any other base may be used. If some of the questions are answered in composition form they may be marked by the method of general impression.

(*c*) *Negative marking.* In the negative scheme of marking, the mistakes only are marked. Each mistake is given a certain value and the total deducted from the maximum. This form of valuation is applicable to composition work, dictation and spelling exercises, translation work, and the like. From a rigid point of view the negative method is not just since it ignores the number of right answers in a paper. To stimulate pupils it may be used but it should not be employed where the result of the test counts for or against a boy's promotion or standing.

Sometimes a margin may be left for general impression. Thus, out of a maximum of 100, 10 or 20 marks may be allowed for general impression based on arrangement, English, etc., of the paper, and the rest of the marks may be given on a positive basis.

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Thus, in arithmetic, 10 may be allowed for each of 9 examples, and 10 for the general arrangement, etc., of the paper. In history or geography arrangement and general English may be made the basis of general impression.

6. **Estimating the results.** After a class has been examined it is necessary to form a valuation of the work

	A	A¹	A²	B¹	B	C	C¹	D	E
	100	80 (QUARTILE)	80	100 (MODE)	100	80	100	100	100
	100	80	60	100	100	60	90	80	80
	100	80	60	100	100	60	90	80	80
	80	80	60	100	100	60	90	80	80
	80	60	60	100	100	60	90	80	60
	80	60 (QUARTILE)	60	100	100	50	90	80	60
	80	60	40	100	100	50	90	60	60
	80	40	40	100	100	50	80	60	60
	80	40	40	100	100	50	80	60	60
	80	40	40	100	100	40	70	60	60
	60	40 (QUARTILE)	20	100	70	40	70	40	60
	60	40	20	80	70	40	70	40	60
	60	40	20	80	70	30	70	40	60
	60	40	20	80	70	30	70	40	60
	60	20	20	80	70	30	60	40	40
	40	20 (QUARTILE)	20	80	70	30	60	20	40
	40	20	20	80	70	30	60	10	40
	20	20	20	80	70	30	60	10	40
		20	20	80	60	30	60		40
		20	0	80	60	20	40		40
		0	0	80	60	20	40		40
			0	80	60	20	40		20
				80	60	20	40		20
				80	60	20	30		20
				60	40	20	20		20
				60	40	10	20		20
				60	20	10			20
				40	20	10			0
				20					
				20					
				0					
Av.	70.5	44	33	77.4	73.8	36.2	63.1	54.7	48.2
M.V.	*14.6*	*19.8*	*18.8*	*18.8*	*19.8*	*15.1*	*17.9*	*20.8*	*19.0*
M.V. per.	20.7	43.6	56.9	23.5	26.8	41.7	28.3	38.0	39.4
	6th yr.			4th yr.		4th yr.		6th yr.	5th yr.

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as a whole. The most common plan followed is to strike an average of all the marks given. The misuse of the average as a basis of classification has been shown. After a class has been formed, however, and after pupils of approximately like ability in some subject or group of subjects have been working together, some method must be followed for the purpose of determining the value of the work as a whole and also for the purpose of comparison.

The preceding series are the results of tests given under varying conditions, and to different grades. The marks are on the basis of 100.

The best known measure is the *average.* Suppose we have ten cases as follows, 100, 100, 90, 90, 90, 80, 80, 80, 40, 30, 0. The sum of these cases, 680, divided by the number of cases, 10, will give 68, or the average. Each case differs from 68 by a certain amount, as follows, 32, 22, 22, 22, 12, 12, 12, 28, 38, 68. These are called variations from the average. The average of such variations, 26.8, is called the mean variation (M.V.). The per cent which this variation is of the average, 39.4, is called the mean variation per cent. In the average, the extreme cases, 100 or 0, may have too great an influence and may cause the results to seem somewhat misleading. Thus suppose we take some such series as, 80, 80, 80, 80, 80, 80, 0, 0, 0, 0. The average of this series is 48. The average would show that the class failed, while the individual cases show that .60 of the class has really passed.

A better method of estimating examination results is to consider the *predominant rate* in the series. In the last mentioned series, this rate or *mode* is 80. In the table given above, series B^1 of the 4th year has a mode

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of 80–100. The mode does not include the extremes of the series but takes in the greater number of cases which are between similar limits. The mode is of little use where the individual cases are very irregular. If the individual differences are great enough to give rise to two or more distinct modes, then we may consider that the individuals concerned belong to different classes in the series.

Another measure which might be used is the *median*. This is the rating opposite the middle case in the series. The series should be arranged in the order of value, from 100 down. In a series of 19 cases, the median would be the tenth. In a series of 20 cases, it would lie between the tenth and eleventh. In the table, series *A*, 6th year, the median is in heavy type. The series might also be cut up into *quartiles*, *sextiles*, *octiles*, or *deciles*, according as the basis of division is a quarter, a sixth, an eighth, or a tenth. The average of the top and bottom quartiles or sextiles might be used to fix the grade limits. The average of the top quartile of any grade will usually be found to be higher than the bottom quartile of a grade one or two years higher. The highest quartile of one series might be lower than the highest quartile of another series in the same grade, while in the second quartiles this position might be reversed. The two quartiles about the median, that is, the second and third, are the best for purposes of general valuation. The average of these two quartiles should approximate the type.[9]

The results of an examination can be easily estimated when presented in graphic form. A normal curve will

[9] See, Thorndike, E. L., *Theory of Mental and Social Measurements.*

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have the greatest number of cases towards the center, and fewer cases towards either the perfect or the failure end. A skew curve will have most of the cases towards either the failure or the perfect end. In arranging the distribution of cases, the figures at the side indicate the number of cases, and the figures at the bottom

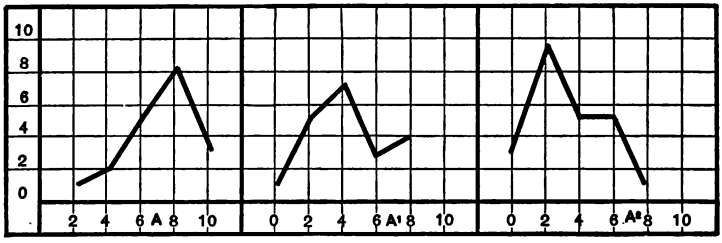

FIG. 2. — Sixth year, boys.

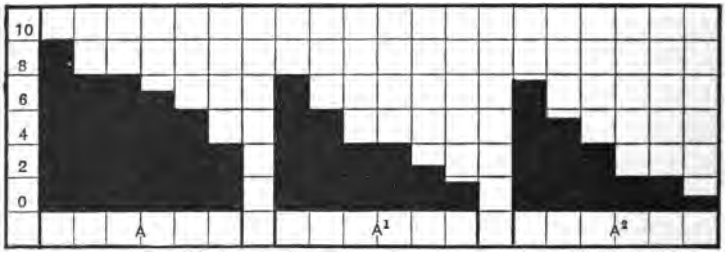

FIG. 3. — Sextiles (approximate) to correspond with series in Fig. 2.

indicate the values obtained. The gradation in the series may also be shown. If sextiles are used, the values obtained are placed at the side. The six bottom divisions indicate the sextiles. In the following figures, the curves and sextiles are plotted from the table of values given above.[10]

The first three curves, A, A^1, and A^2, 6th year, are based on tests given to the same class. The first curve

[10] See page 101.

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is skewed towards the perfect end because of the simplicity of the questions which were selected by the teacher. The low variation per cent also shows that

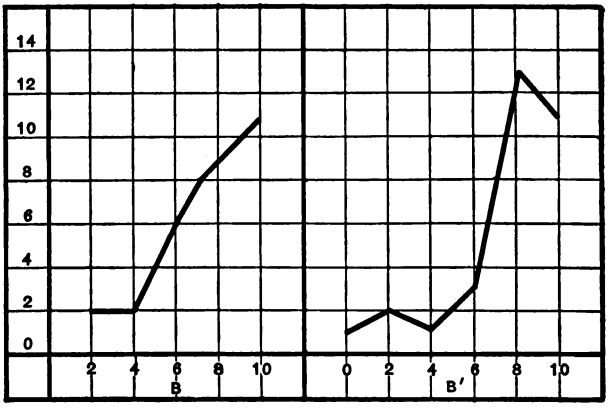

FIG. 4. — Fourth year, boys.

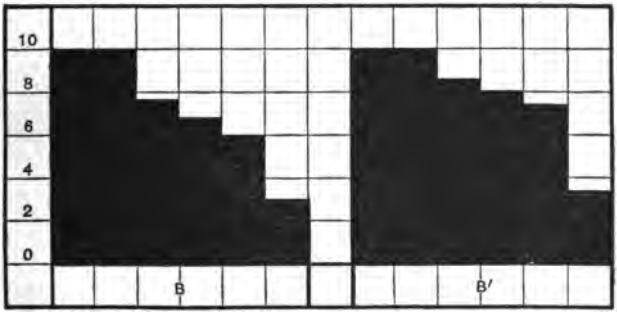

FIG. 5. — Sextiles (approximate) to correspond with series in Fig. 4.

the questions either are very simple or that they had been drilled upon before their selection. The second curve shows more of a tendency towards the normal. In this case the questions were selected by the teacher and sent to the principal. The principal selected some

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of the questions, changed some, and added one or two similar to those submitted. The variation per cent for the second series is higher, though more nearly what it ought to be. The third curve is skewed towards the

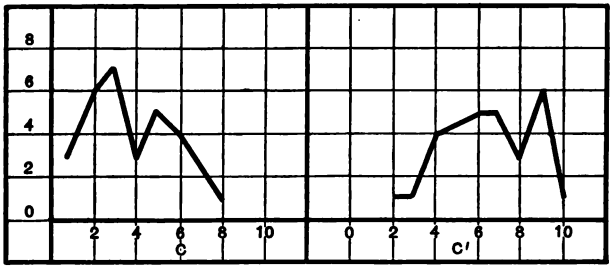

FIG. 6. — Fourth year, girls.

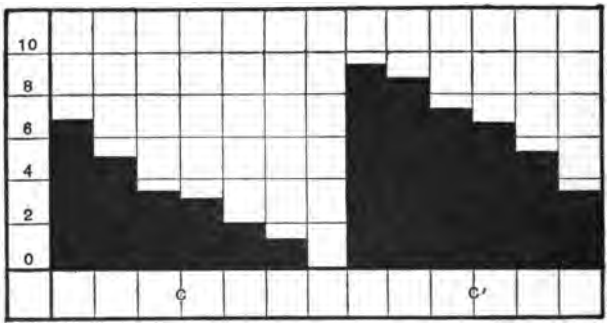

FIG. 7. — Sextiles (approximate) to correspond with series in Fig. 6.

failure end because of the relative difficulty of the questions which were selected by the principal.[11]

Curves B and B^1 are skewed towards the perfect end. In this case the questions were relatively difficult and were submitted to the same class at different times. The high results are due to thoroughness in drill and to

[11] See the series on page 101 for the variation per cents and other data.

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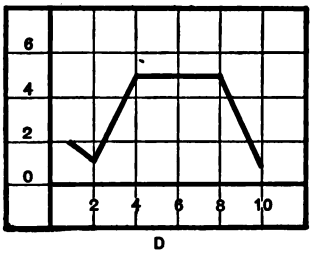
excessive time spent upon the subject. The small variation per cents also indicate thoroughness of drill. Curves C and C^1 show less satisfactory results. These are due to the sex of the class and to the lack of drill.



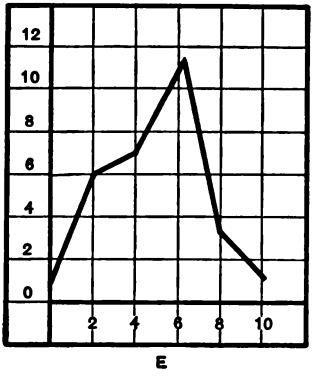


FIG. 8. — Sixth year, girls. Fifth year, girls.

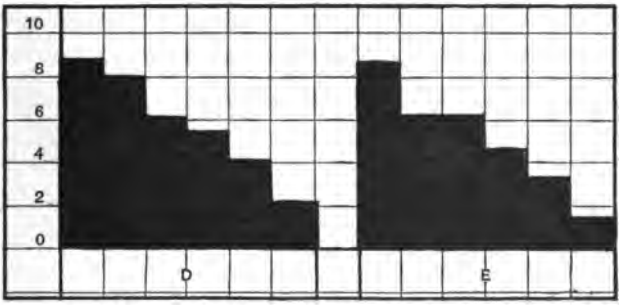


FIG. 9. — Sextiles (approximate) to correspond with series in Fig. 8.

Girls will be found to do poorer work in arithmetic, though in English and manual work they will be found more proficient. In curves B, C, and D the questions were selected by the teacher. In curves B^1, C^1, and E questions were submitted to the principal who changed the wording and the figures, and added one or two ques-

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tions. When the gradation in the sextiles is too sudden or too steep, individual promotion, or individual instruction may be needed, according as the results are high or poor.

§ V. Special Classes

Organisation in general. The discussion thus far refers to the normal child. For children who vary greatly from the normal a somewhat different treatment must be given according to the individual differences which are present. If education is to be universal the afflicted and atypical children should also receive some consideration.

(*a*) *General conditions.* The education of children in special classes is possible under four conditions. They may be cared for (1) in a private institution or asylum, (2) in a public institution devoted wholly to one special class, (3) in the home under private care, or (4) in a classroom of one of the regular schools. In general it is advisable to regard the education of special classes from the same standpoint, economical and educational, as that from which the education of normal children is regarded. In the latter case the state undertakes to educate the children but it does not agree to feed, clothe, and shelter them. Contrariwise, if the state agrees to educate children, it should not neglect those who are afflicted in any way. The rule should hold for all, weak and strong alike.

An objection against the institution or asylum is that the parents are relieved of all care of the child, as far as food, clothing, and shelter is concerned. They are also freed from the usual trouble connected with the bringing up of children. If, however, only the

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education of the child is in question, the parents should undertake the other duties of caring for the child. A second objection is the relatively small area which an institution can cover. Such places are usually too far from the homes of the children to allow them to attend daily, and so they must either stay at the institution or else give up all its advantages. At times the remoteness of the institution makes it practically unknown. Education through private tuition is practically out of the question as far as the greater number of afflicted children is concerned. Most families are satisfied if they can bring up their children in the usual manner without going to the expense of private tuition. Moreover, since they pay taxes they are entitled to consideration at the hands of the state. Special classes in the public schools should be formed, or there should be established a number of small special schools properly distributed.

Some care should be shown in securing locations for special classes and in distributing them properly. There should be centers for each class of afflicted children. If the city or town is divided into school districts there should be a room in one or two schools of the district for some special class of children. Each district should have a number of schools within easy reach of the children concerned, one having a class for crippled children, another a class for deaf and dumb children, a third a class for weak minded children, and the like. There will then be a number of special classes for different kinds of children distributed throughout the school district. If the number of children is too great to be provided for in this manner, then small schools for each type of afflicted child should be distributed throughout

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the city. A number of each type of school should be placed within reach of the children.

(*b*) *Entrance and dismissal.* The entrance and dismissal of the pupils will depend upon the special class in question. In general, classrooms should be on or near the ground floor. Pupils should be dismissed a quarter of an hour or so before the rest of the school, and should come somewhat later than the regular pupils. In this way conflict will be avoided and special pupils will not be subjected to so great a strain.

(*c*) *Teachers.* The teachers selected for special instruction should have the spirit of the kindergarten. Such teachers may be selected from qualified kindergarten teachers, from regular teachers who show a liking for the work, or from a list of applicants who have passed required tests. The danger to be avoided in the selection of teachers is that arising from an introduction of the deadening school routine into the special class. If the regular machinery is introduced it may crush children who already have to bear the burden of their affliction. It is needless to add that special teachers should have qualifications over and above the regular qualifications, and should be paid according to a special salary schedule. No teachers should be assigned to a special class because they show inefficiency in regular class work, or because a special class is a means of getting them out of the way.

(*d*) *Instruction.* By the nature of the case, instruction must be almost wholly individual. The size of the class will depend upon its kind. In no case should it exceed fifteen or twenty pupils. It may have as few as five or ten pupils. As regards the subject matter, this should be similar in kind to that which is taught

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to the regular classes. Children in special classes should be carried as far in the regular course of study as their mental and physical strength will allow. As a minimum they should be taught such expression as is necessary for human intercourse. They should also receive instruction in some pursuit by which they can later support themselves. Since the usual method of learning handicrafts is shut to afflicted children, this should receive consideration in the school where special methods may be employed. The periods of instruction should be shorter than the regular periods. In the matter of schedule the teacher should be left free to do practically what he thinks right. A definite program, however, should be followed. So long as the children are happy and contented, and show some progress in their work, no fault should be found with individual programs or arrangements in the matter of instruction, within such limits as are set by the school officials.

(*e*) *Discipline.* The discipline in special classes should be especially mild and humane. Patience in the teacher is a cardinal virtue. The rigidity and uniformity which are forced upon normal children should have no place in the special class. Healthy children manage somehow to live through it all, but weakly or afflicted children would be crushed beneath its weight.

2. **Classification in general.** For pedagogical purposes special classes or schools should be formed for (1) backward children, (2) crippled children, (3) deaf and dumb children, (4) blind children, (5) feeble-minded children, (6) delinquents, and (7) moral defectives.

Backward children are those who seem unable to do the grade work even when minimum requirements are demanded. Three classes of such children may be

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distinguished according to the reasons for their backwardness. In the first place, there are those children of normal ability who because of change of residence, of change from school to school, of ill health, etc., are not in the grade which they should be when measured by the standards of age, general appearance, and general intelligence. In the second place, we have children who are below mediocrity in intelligence, who are slow to understand the work, or who, because of a nervous disposition, are unable to do routine work. In the third place, we have foreign-born children who may be able to understand the subject matter in their own language, but who lack such control of English as will enable them to express themselves properly, or to understand the advanced instruction which is given.

Crippled children are those who are unable to walk without crutches, braces, or other assistance. They may in addition be sickly, afflicted with some form of tuberculosis, weakened through malnutrition, etc. Usually they are extremely nervous and excitable when first taken in hand. Many crippled children are normal in intelligence and morality, but are hindered because of their inability to go to school, or to use the regular school fixtures.

Deaf and dumb children need no special description. The same is true of blind children. In the former case the children may be only partially afflicted.

Feeble-minded children are those who have something of their mental equipment missing either from birth or because of accident. Feeble-minded children vary from idiots and imbeciles to children with very weak intelligence. They should be distinguished from the insane. As Barr points out, one who is insane may

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be cured. One who is feeble-minded, however, has some defect which renders him incurable, and educable only to a certain point. 'Mental defective' is a somewhat objectionable term since, in the first place, deaf and dumb or blind children are defective, in the second place, some children are morally defective, and finally, 'feeble-minded' is a term less repulsive than 'idiot,' 'imbecile,' or 'defective.'[12] The worst cases of feeble-mindedness have no place in the school. Thus, idiots who are helpless and untrainable, and idioimbeciles who are improvable only to the extent of self-help and of training in simple automatic actions belong to the asylum.

Delinquents should be distinguished from moral defectives. Delinquents are normal children who, because of improper home surroundings, etc., have little appreciation of the social standards of right and wrong. Such children may vary from the truant and disorderly child to the child, who, associating with adult criminals, may pilfer, steal, and commit crimes. The delinquent is the result of his environment. The moral defective, however, is so because of his birth. His features usually vary from the normal. Even if he has proper home surroundings, with a perversity which is innate, he will seek evil companions and do wrong because it comes natural to him. If a moral defective becomes a menace, his place is in some special institution.

3. **Backward children.** A class of normal children who are backward in one or more subjects because of change from school to school, illness, etc., should contain not more than fifteen or twenty children. Indi-

[12] Barr, M. W., *Mental Defectives*, 88, and Ch. III.

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vidual instruction should be given in the subjects in which the child is weak. In such subjects more time should be spent than is called for in regular work. The work of the teacher should be guided by the individual wants of the children. As soon as a child has made up what he has lost or failed to get he should be placed in a regular class.

Children who are below normal ability and intelligence should not be classed with those just mentioned. A class of twenty should be divided into two or three groups according to age, ability, and attainments. The regular school work should be followed with special emphasis upon manual work and manual aids, and with less stress upon the formal subjects. Individual instruction should predominate. To encourage the children and to indicate their progress in some way they should be promoted from group to group, with different books for each group. As soon as a child has covered the minimum requirements of the course of study he should be allowed to graduate with the rest.

Foreign-born children should form a class by themselves. Emphasis should be placed upon oral and written English. As soon as the child seems able to do regular work he should be given instruction for a few weeks in the work of the grade for which he is fit. He should then take up work in a regular class.

A few points should be remembered by the principal in the formation of classes for backward children. The backward child is not one who is to be hurriedly pushed through enough work to make him eligible for working papers. He is less fit to go to work than the normal child and so should be kept in school as long

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as possible. So long as the school does not give instruction in trade, industry, etc., it should adapt the course as much as possible for the purpose of holding children as long as it can.

4. **Crippled children.** The chief difficulty in the education of crippled children is their transportation. At times the question of feeding at noon must also be considered. They should be transported to and from school. At noon they should be provided with a hot meal. Milk of the proper quality should be supplied at all times. Sessions should begin a quarter of an hour after and should end a quarter of an hour before the regular sessions. If children remain at school for lunch, the sessions should begin a half hour after, and should close a half hour before the regular sessions.

A class should not exceed twenty pupils. Boys and girls of all ages may be instructed together. If there are two or more classes in a district, the boys might be sent to one class and the girls to another. Groups should be formed within a class. The children should be carried ahead in the regular grade work as fast as their physical and mental condition will allow. A healthy child who has been kept from school till late may cover the regular course in two, three, or four years. If some mental defect accompanies the child's disabled condition much less can be accomplished.

5. **Deaf and dumb children.** Classes for deaf and dumb children should not if possible exceed ten children especially in the early stages of instruction. Pupils should be instructed in the German or oral method of expression and also in the sign or manual method. In the oral method the children should learn to read the motions of the lips of the speaker and also to talk. In

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learning to talk the pupils are guided by feeling the throat muscles, etc., of the speaker, and by closely watching the position of the mouth, lips, etc. Lip reading and talking, however, are somewhat difficult and all children can not obtain the same proficiency in them. The sign or manual method is the one in use among the deaf and dumb themselves. An ingenious method of finger language, devised by Dalgarmo (1680) and revived by Bell, enables mutes to talk into each other's hands. Each space between the finger joints and finger tips and parts of the palm corresponds to a letter of the alphabet.

Individual instruction should be used so that brighter pupils may not be kept back by the others. The regular course of instruction should be followed. The teacher, however, should be allowed the greatest freedom in mapping it out and in presenting it to the children. Promotion should be from group to group. When a pupil has finished the minimum requirements of the course he should be allowed to graduate with the regular class.[13]

6. **Blind children.** Much of what has been presented in the preceding section holds for classes of blind children. Classes should not number more than ten children. Transportation may be effected by means of stages as in the case of crippled children. Children should be taught how to read raised print and words in braille or point alphabet. They may also be taught how to print or write. The regular course of study should be pursued with special emphasis upon music and manual work.

[13] See, Love, James Kerr, *Deaf Mutism;* Arnold, T., *On the Education of the Deaf*, Revised and rewritten by A. Farrar.

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7. **Feeble-minded children.** Feeble-minded children are usually marked by features varying from the normal. Asymetric, flattened, or misshapen head, deformed ears, flattened or rudimentary nose, large coarse mouth, thick lips, thin inexpressive lips, are some of the stigmata. In addition, there may be imperfect or stammering expression, shambling gait, weak powers of attention, erratic conduct, marked ability in some narrow field with lack of power in other subjects, etc. No child should be assigned to a class for defectives until he has been tried under several teachers and until his case has been diagnosed by a competent specialist. Some inquiry should be made into the conditions surrounding the life of the child, his birth, family history, health, peculiarities, etc.[14]

The room and the surroundings should be as cheerful as possible. Physical conditions should be cared for. Exercise, play, bathing, and feeding should form a portion of the class work. Milk and bread should be supplied. According to Barr,[15] "statistics show that 10 ounces of bread and 1 pint of skimmed milk equal in nutrition a diet composed of 8 ounces of soup, 2 ounces of beef, 2 ounces of potatoes, 1 ounce of turnips, 4 ounces of bread, ½ ounce of butter, and 1 cup of coffee containing 1 ounce of new milk and ½ ounce of sugar." Each pupil should be carried as far in the course of study as he can go. Instruction should lay special emphasis on manual aids, as coarse weaving, simple modeling, easy shop work, and the like. Abstract and formal work should be reduced to a minimum. Artificial incentives, mild discipline, and patient repetition are necessary. Games, entertainments, danc-

[14] See, Barr, M. W., *Ment. Def.*, Ch. V. [15] *Ibid.*, 170.

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ing, simple athletics, and other means of social expression should be employed.

8. **Delinquents.** A class of delinquents should number about twenty. Before a child is placed in such a class he should be tried with a number of teachers. Instruction should emphasise manual aids, athletics, games, social entertainments, etc. Less stress should be placed on abstract and formal subjects. A course of instruction in conduct should be followed and class control should be humane and mild. The class surroundings should be pleasant and agreeable. Fear and intimidation should have no place in class discipline. Individual help and instruction should carry the pupils as far and as fast as they can go. If the home and other surroundings are too harmful, if criminal associates still guide the child's conduct outside of the school, he should be removed entirely from his surroundings and placed in some institution founded on the cottage plan.[16]

9. **Moral defectives.** Moral imbeciles and defectives should be treated much like delinquent children though they should form a class by themselves. The physiological treatment suggested for mental defectives should also be given. Frequently moral defectives are also mentally defective. Instruction and discipline should then follow in general the method of educating mental defectives. Should a child prove to be beyond school control he should be placed in some special institution. Some instruction should be given in a trade, industry, etc.[17]

[16] See, Snedden, David S., *Administration and Educational Work of American Juvenile Reform Schools.*

[17] See *The Psychological Clinic*, Ed. by Lightner Witmer. For details of organisation I am indebted to Principals W. F. Kurz and J. J. O'Reilly, of New York.

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CHAPTER III

ATTENTION AND INTEREST

§ I. Interest

1. Bases of interest. In a loose and general way interest and feeling or interest and instinct are expressions commonly used one for the other. We are said to feel interest in this or that occupation, to have instinctive tendencies towards some activities in preference to others, and so on. While interest is a peculiar kind of feeling it does not follow that it is a feeling of pleasure-pain. It is based on pleasure-pain, instinct, etc., but it is neither of them.

(*a*) *Interest and feeling.* A newly-born babe does not show any special interest one way or the other. It is not consciously impelled, for example, to struggle for the milk bottle in preference to some other bottle. Only after the child has tasted and enjoyed the milk will it strive again to realise the pleasure which it experienced on the previous occasion. Presentation of the milk bottle will then arouse tendencies and an attitude which is felt as interest, an interest of striving, conation, appetition, of attempts at motor realisation. Interest in school work is based on similar motor attitudes. In an interesting lesson, the teacher does not strive to make things easy and pleasant for the children, nor should there be a subdued and quiescent state, a calm serenity and muffled air as far as

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the children are concerned. Such a condition is transient, a temporary state of pleasure excited for the moment, and not necessarily of more than passing nature. Should the lesson, however, lead to some pleasing or satisfying state, should its end result in pleasure, ease, satisfaction, etc., it will excite interest when again presented, will stimulate the pupils to motor attitudes and tendencies towards realisation.

(*b*) *Interest and instinct.* The same holds in the case of instinct. A situation presented to the child will excite instinctive behavior. The child will react in a number of ways. It will construct or destroy, test, manipulate, and the like. After such instinctive control has taken place, interest in the situation will tend to be developed if the results have been favorable, that is, if the reactions have terminated in a pleasing or satisfying manner. It makes little difference at first if such terminal pleasure or satisfaction arises out of the activity itself or has been artificially produced. In many of the school subjects special incentives are necessary if interest is to be created. This phase of the question will be more fully brought out in later sections of the chapter.

2. **Motor aspect of interest.** Instincts may start a process and pleasure-pain may stamp the situation as one of value, one which should be sought and striven for. The re-presentation of the situation will then call forth motor tendencies and attitudes which are felt as interest.

(*a*) *In presentation.* Any object or situation, control of which has resulted in pleasure, ease, quiescence, or satisfaction, will excite interest when it is again presented. The residual motor traces left after the first control will again be excited. The individual will strive

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to react in the manner which originally produced feelings of pleasure or satisfaction. The object or situation comes to have meaning and significance. A child, for example, may come early, may get a high per cent, may present a neat paper, etc. Commendation, credit, exhibition of work, and the like, will emphasise any satisfying state which the activity has in itself. If the incentives are held forth, the child will tend to put forth effort in the specific lines approved, will take interest in the work, will feel tendencies and attitudes favorable to its continuance.

If the original situation resulted in pain or dissatisfaction for the child, its recurrence will excite tendencies and attitudes of a negative character. Continual scolding, nagging, faultfinding, vituperation, caustic comment, disapproval, remarks of sarcastic or sneering nature, and the like, will hardly excite much interest in the school work. A child may do such work to avoid worse punishment, but of its own account will not be stimulated towards renewed effort. The pain-producing situation will have an interest for the child, but it will be negative interest. He will strive to avoid it, or, if some punishment is threatened, will seek to prevent it. Interest of such a sort may produce results, but they will hardly be of much value as far as the development of lasting interests are concerned.

(*b*) *In ideation.* In representative mental processes the motor attitude is usually more refined. It may assume the form of innervations felt as longing, or striving, or it may be a body attitude, an organic set, as it were, in a definite direction. In reading an interesting book one will feel motor strains and stresses,

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as the tense condition of the body, the leaning forward as if to start towards the end to be reached, tendencies in the extremities, and the like. Such interest is present in the boy's attitude towards 'wild-west' stories, in 'penny-dreadful' narratives, etc. His entire bearing is one of eagerness, of striving, of endeavor to reach and possess for the time the situation which he feels will result in pleasure, satisfaction, ease, or quiescence. The mere sight of a coveted book will rouse him and will release a host of motor tendencies. If conditions are imposed antecedent to possession, if work is required before realisation is made possible, he will show his interest by engaging in the activity required. So, too, in ideal interests in which there is some end to be reached, some problem to be solved, some solution to be accomplished, some ideal to be realised, there are present a striving, an organic restlessness, and an output of motor innervations which drive the individual towards his ideal goal. When not in the process of realisation, these tendencies, strivings, and attitudes are felt as interest.

(*c*) *In motivation and volition.* These strivings, attitudes, and tendencies impel the individual towards the realisation of an ideal end. They assume more explicit form in the process of realisation. The attitude then rolls out, as it were, into a series of actions, into a chain of concrete motor processes. This is the culmination of the interest. Some end or terminal situation rouses motor attitudes and reactions because in it exist implications of some pleasure or satisfaction which has been felt before. Interest is present in such a case and persists while the series of reactions is taking place and up to the process of realisation. When

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the final situation is reached the interest is replaced by another feeling, a thrill of pleasure, a blissful period of ease and quiescence, a condition of satisfaction, etc. It is this feeling of pleasure, satisfaction, and the like inherent in the end to be attained which excites the motor tendencies to realise the end. This motor attitude is felt as interest. Interest is thus teleological, end-seeking. It tends to drive the individual ahead towards the realisation of some aim, some ideal construction, some re-presentation of a situation which has already yielded pleasure, ease, quiescence, or satisfaction. If a possible terminus is one of pain, unrest, dissatisfaction, or the like, similar strivings will be felt, but in a negative direction. An end will then be one which is to be avoided.

3. **Ideal aspect of interest.** To have more or less definite direction, any attitude, striving, or tendency must be subject to some kind of cognitive control. Where, as in automatic action, such control is not present, interest can not be said to be present. The ideal forms of interest are simple awareness, image or idea, and free ideation.

(*a*) *Simple awareness.* The stimulus which excites an individual is only a part of the total moment of consciousness. Experience gives impressions a tinge of meaning, a local color, a special signification. After a child has reacted to an impression, and has attempted motor control of an object, the situation will mean one thing rather than another according as some aspects have been emphasised in preference to others. A pencil, thus, will mean something different from a candle, or a stick of candy, or a pen, etc. The impression will have in addition a halo of meaning, which will

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excite attitudes and tendencies in a more or less definite direction. This cognitive aspect is closely bound with the conative or motor aspect, the ideal giving direction to the motor, and the motor giving body to the ideal.

(*b*) *Image or idea.* In more definite form the cognitive element in interest may be an image or idea. Instead of a real object or situation, a mere suggestion or associated memory may be sufficient to rouse motor attitudes and innervations. Promise of a satisfying terminus, recall of a pleasing situation, mention of an object to be attained, etc., may rouse attitudes and tendencies similar to those excited by the real situations in question.

(*c*) *Ideation.* In more advanced form the ideal aspect of interest may exist as a system or a series of ideas. Some ideas may be connected with the aim, evolved out of it, and bound with the present situation in hand. This stage of interest is present in all controlled action towards a definite end, as, in the planning of work, the developing of an ideal, the building of a structure, and the like. For example, a student may have in view some honor, prize, fellowship, position, etc. This is the future situation which he conceives to be within his reach and towards which he strives. The idea of the aim excites an attitude and tendencies which are guided in part by a chain of ideas and images. An ideal bridge is thrown across the gap between the present and the end to be realised. Thus, information must be sought, studies pursued, work accomplished, etc., before the desired goal can be reached. Interest in the ideal means persists because of the end which is desired.

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4. **Definition of interest.** Interest is a motor attitude guided by an ideal content.

On the motor side the attitude is felt as a conation or striving, and tends towards explication in a series of movements and reactions. On the ideal side the present moment of interest may be a mental disposition, a series of ideas, a single image, an idea, or simple awareness or fringe of meaning.

5. **Kinds of interest.** Of the kinds of interest we may have (1) curiosity, (2) expectation, and (3) desire.

(*a*) *Curiosity.* A situation which is known in part and which, at the same time, contains elements which are strange, uncommon, or unknown, will tend to excite curiosity. The known elements will tend to excite definite reaction and control. The unknown elements tend to divert or to repress definite manipulation. Complete reaction is thus impossible, final realisation is impeded, and so further experimentation and control are attempted. A tentative interest is aroused which impels the individual to realise a condition of ease or quiescence. The unknown elements contain new possibilities, and in addition the unrest caused by imperfect knowledge excites motor tendencies towards more perfect control. Interest thus is felt and motor reactions excited. Curiosity has little pedagogical value unless it leads to a situation which will either strengthen an old interest or establish a new one. Curiosity should not be allowed to evaporate in feeling, or in the blasé quiescence of the street idler. An experiment, for example, may excite curiosity in the pupils. To render such tentative interest more lasting, the pupils should do similar experiments, make drawings, and express themselves in a definite manner.

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(*b*) *Expectation.* In curiosity we start with a situation which is present and which is partially known. In expectation, however, the end to be reached is not present. Some hindrance is in the way of complete realisation. We have some idea of a future situation which is to affect us pleasurably or the reverse, and take an attitude towards this future state, the attitude of expectation. We strive to react, to realise fuller control, but can not do so. We must wait till either the situation reaches us, or till we come to the situation. No means are evolved to connect the future with the present. The element of time alone interferes. The weak side of expectation is its passive character. The idler who expects something to turn up, the youth who hopes to become famous through no special effort of his own, the student who imagines he will pass, somehow, each pictures rosy conditions which are to be thrust upon him, each takes an attitude towards a situation, without doing anything to realise the end in view.

(*c*) *Desire.* In desire, the motor tendencies are much stronger than in expectation or curiosity, and the general attitude is much more effective in impelling response. The situation to be realised may be at different degrees of remoteness from the individual. It may simply be out of reach of the individual, or it may exist as an idea or a plan. As soon as the motor tendencies become strong enough to result in action, as soon as steps are taken to bring the coveted situation within control of the individual, we have the passing of interest into volition and deliberate action. Control of a situation which has resulted in pleasure or satisfaction, will leave traces favorable to further control. If the motor tendencies are sufficiently strong,

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deliberate action will be planned and steps taken to bring about a similar state of affairs. Volition is thus the most advanced form of interest. Action is the result.

6. **Stages of interest.** A full-blown interest can not be expected without some development. At best only the simpler forms of interest are at first present, and even these require some experience and guidance.

(*a*) *Primary interest.* In the most elementary stage of interest some situation directly present excites motor tendencies because of the possibilities of a control which will lead to pleasure or satisfaction. Some situation, *A*, when actively manipulated, leads to pleasure, ease, quiescence, or satisfaction. A child may thus work in clay, do some task, engage in some occupation, etc., and receive commendation for his efforts. The terminal satisfaction and pleasure will impel further manipulation and control, or will excite an attitude favorable to such control.

(*b*) *Secondary interest.* The situation which is to yield pleasure or satisfaction may be beyond reach. It may be more or less prospective. The end to be realised, *A'*, is then connected to the present by some means. Manipulation and control of some means, *c*, *b*, etc., are necessary before *A'* can be reached. The interest in the final situation, *A'*, is direct and primary, but since this situation is not present, some means leading to it must be thought out. Effort is put forth to realise these means. They are connected with the end, and hold interest because of such connection. They possess a secondary interest. If the means have an interest of their own, or if they are pleasurable in themselves, they will excite effort over and above that of the secondary interest.

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Secondary interest may lead to an extremely complicated series of means. Some situation, A', may require the mediation of other situations, B', C', etc., which in turn may necessitate control of a number of means, *b*, *b*, *b*, etc., *c*, *c*, *c*, etc., *d*, *d*, *d*, etc. Realisation of the means, *d*, *d*, *d*, etc., will realise C', control of C' will facilitate control of *c*, *c*, *c*, etc., and so on through the other situations which lead to A'. The educator striving to realise an aim, the philanthropist working for an ideal, the inventor planning some great work, etc., all are examples of the continuous and persistent effort necessary for the realisation of an ultimate end.

(*c*) *Acquired interest.* In the various processes leading to final realisation, the individual may engage in activities which come to acquire an interest in themselves. The activities may lead to a pleasure or a satisfaction aside from their connection with the end. During the process a residual modification of the self may lead to greater possibilities for expansion, enjoyment, and activity. A secondary interest in school subjects due to external incentives may result in primary interests in some of the subjects themselves. The pleasure arising from constructive exercises, from success in mastering difficulties, etc., may result in direct, acquired interests. Acquired interest is much like primary interest, with the difference that acquired interest is the result of a secondary development.[1]

[1] On interest see, Arnold, F., *Attention and Interest, A study in Psychology and Education.* A full treatment of attention and interest is here given. See also, Dewey, John, 'Interest as Related to Will,' *Second Supplement to the Herbart Yearbook*, 1903. Further references will be found in *Attention and Interest* just mentioned.

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§ II. Interest in the Classroom

1. **The problem of interest.** To secure and develop interest, the teacher must have a definite end in view, and must follow a few fixed rules. In the first place, the child must have something to do, something which will call forth motor reaction. In the second place, the activity of the pupil should end in pleasure, ease, satisfaction, or the like. The work itself need not be attractive. Considerable effort may be required on the part of the pupil. But whatever the child does should receive approval of some sort. As far as the teacher is concerned, he must (1) carefully plan each day's work, (2) have his material ready for distribution, and (3) have at hand a graded series of incentives.

2. **Approval and disapproval.** Some of the most important incentives have been considered in the first volume. A review of them is all that is necessary. An incentive which is effective in stimulating effort, and which reaches all pupils, is exhibition of work. A paper which is neat and clean, and which shows that the child has tried, should be shown to the class, and exhibited in front of the room. Devices for the exhibition of work are burlap stretched loose upon a frame, or upon the wall moldings, picture wire and paper clips, etc. Public commendation will be found useful in capping the efforts of a pupil with pleasure and satisfaction. A child seems never to tire of hearing how good his work is. In fact, most of us are afflicted in the same manner. It is just as easy to praise as to censure, and the former is much more effective in securing a ready response. Marks may be used to indicate standing, good work, and the like. Honor

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rolls, star charts, etc., are some of the devices used to indicate special merit. If the work is not worthy of approval, refusal to exhibit, lack of commendation, demerits, etc., will have the effect of disapproval.[2]

3. **Self-activity.** To develop the motor attitude necessary in interest, the teacher should allow the child to do as much of the work himself as is possible. Modeling, paper cutting, drawing, coloring, outlining, diagraming, writing, figuring, etc., are some of the activities which should be allowed. The efforts of the pupils should then be capped with pleasure by means of approval and commendation. Anything which will relieve the children of the tedium of listening to the verbal statements of the teacher will stimulate interest.

4. **Multiple sense appeal.** In every lesson the teacher should think out devices which will appeal to all the senses of the children. Careful planning of the day's work is necessary. The blackboard should be used for visualisation. Different colors should be used for the sake of variety. The children should repeat individually and in rows what they have studied visually. They should express themselves in writing, drawing, outlining, modeling, constructing, etc. This method should be used in spelling, studying of tables in arithmetic, map study, study of outlines in history or geography, memorising of poetry, and the like. The usual barren verbalism of the lecture should give way to more active appeals.

5. **Imitation.** Reactions of children are extremely crude and undisciplined. Careful models should be set, and the structure and development of such models

[2] For a full discussion of the subject of approval and disapproval see, Volume 1, Ch. XI.

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slowly explained. In arithmetic, the problem should be stated, solved, and then worked out, step by step. Similar steps should be taken in grammar, geography, map drawing, and the like. Method in this connection has already been set forth.[3]

§ III. Attention

1. **The given situation in attention.** To be attentive, the child must have something to which he can attend. Moreover he must be in full control of the object or situation if attention is to be of the best. If the child is rigid and erect it is evident that he can be but partially attentive. Where attention does not require manual control, a single situation will suffice for the entire class.

Any situation in attention will have two aspects, (1) the subjective, and (2) the objective. The subjective aspect of attention includes all stresses, strains, attitudes, motor tendencies and manipulations, ideal elements and physiological factors that are stimulated by the given situation. The objective aspect deals with the changes in the situation which result because of the subjective attitude aroused. On the subjective side we have (1) the motor, (2) the ideal, and (3) the physiological aspects. On the objective side we have (1) qualitative, and (2) quantitative changes in the given field. These divisions will be found whether the situation is real or ideal, concrete or abstract, theoretical or practical. One may, for example, attend to a table, or the color of a table, a real table or an idea of it, the construction of one, or the plan necessary for construction.

[3] See chapter I, § 2, (*e*), 'Individual and class instruction.'

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2. **Motor aspect of attention.** When an object or situation is presented to an individual he takes a somewhat indeterminate attitude towards it. If this attitude is favorable towards further control it is followed by a series of manipulations and motor coördinations which seek to bring the object or situation into as close connection with the organism as possible. The object will be touched, handled, brought into contact with the senses, and tried in various ways. The attitude becomes explicit in a series of motor adjustments and reactions.

In this motor response should be noted the excess discharge which is roused, the apparent waste of energy which results, and the large number of movements which are called forth. At first, the proper adjustments are not made and a number of attempts are necessary, before more perfect control is reached. This may be 'hit' upon by accident or carefully taught. In either case considerable waste is to be expected. In the beginning of a new activity, in the presentation of a new lesson, etc., the teacher should not be discouraged by the apparent stupidity of the pupils and by their bungling attempts. He should take such processes as a matter of course, in fact, as a biological necessity.

In less active control the motor aspect assumes the form of stresses and strains. The body may take a more tense and rigid position, the sense organs may fixate the object in question, and more accurate adjustments of the eyes, fingers, etc., made. Tensions are usually felt about the head and body. In attention to ideas and images the motor element reaches a minimum. It is felt in motor innervations, and in head and body movements. The hands and fingers may

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move and indicate the presence of mental activity. Such motor innervations seem to assist in holding ideas and images in the focus of attention. There are usually present respiratory changes. Further visceral changes may follow. These seem to be due to the redistribution of energy and to the general organic disturbance which results.

3. **Ideal aspect of attention.** Closely connected with the motor phase of attention is the ideal aspect.

(*a*) *Ideal reinforcement.* When an impression reaches consciousness it is usually filled out and amplified by ideal dispositions. The impression does not fall on a barren soil, but is assimilated and amplified. As experience increases, fuller meaning is given to the impressions entering consciousness. In more advanced stages the revived images and ideas may unroll in a long series and excite complicated combinations, and organised associations. Connections then radiate from every aspect and enable the object or idea to persist for a long time in the focus of attention. What was, what is, and what may have been form the basis of discursive trains of thought and imaginative wanderings which may go on interminably. A bare time-table or railway prospectus may thus contain infinite possibilities for one who has the proper mental background, while a simple bent wire, or what not, may fascinate one with an inventive turn of mind. Where attention to some end or aim is present, the associated ideas and images are usually more determinate. The idea of the end to be reached will rouse thoughts of means which will lead to the end.

(*b*) *Function of the ideal element.* The revived elements serve (1) to reinforce the incoming impressions

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and ideas, and (2) to give motor guidance and direction. A lone impression will have much less power to hold the center of consciousness and to develop further ideation than one which is warmly received and supported on every side. The revived ideal element may also serve to guide further reaction and control. All that is implied in precedent, tradition, custom, and the like, refers to such guidance and control. New situations can be interpreted only in the light of past experience. If a new departure is made some basis of experience must be slowly constructed in the manner common to states of primary attention.

(*c*) *Conditions of revival.* The external conditions which facilitate strength of impression and facility of recall of the ideal elements are (1) repetition, (2) vividness, (3) recency, (4) primacy ('first impression'), and (5) emotional congruity. Repetition is practically the basis of the depth and strength of the impression made. Next in order come vividness, recency, primacy, and emotional congruity. The last refers to the emotional web in which the original impression was enmeshed.

Internal conditions which affect the revivability and direction of a series of associated ideas or images are (1) their organisation, as, by contiguity, similarity, contrast, cause, design, purpose, etc., (2) their comprehensiveness, (3) the coöperation and strength of cohesion between the parts of the system, (4) the nature of the predominating sensory element, and (5) the general condition of the individual as regards rest and fatigue. Methods of instruction should be worked out with reference to these conditions.

4. **Physiological aspect of attention. Fatigue.** The

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physiological aspect of attention and the problem of fatigue are closely connected. Each should be considered with reference to the other.

(*a*) *Physiological aspect.* The simplest functional unit which can be found on the physiological side is the sensorimotor unit. On the sensory side are the spinal cord, the basal ganglia of the brain, the cerebral hemispheres, the nerve fibers, and the sense organs. On the motor side are the skeletal muscles which produce movement of the head, trunk, limbs, and organs of speech. These are under cerebral control and form the end-organs of the motor nerves. The other system of muscles, the visceral or involuntary, controls the vital functions of the thorax and abdomen. Closely connected with these are the various organs and glands. The skeletal system of muscles forms one terminus for the sensorimotor arcs of which the other terminus is the peripheral system of sensory end-organs. The visceral system is similarly joined with sense organs embedded in the viscera, the two being termini of sensorimotor arcs similar to the arcs of the skeletal system. The two systems of sensorimotor arcs are known to be closely connected.

The simplest reaction calls into service arcs of the lowest level, reflex arcs, in which consciousness plays no part. In reflex action there is immediate response to peripheral stimulation. In addition, the process may leave a trace in the sensory centers of the cortex. As soon as further experience is acquired, arcs of the reflex level become influenced by arcs of a higher level. In a higher level of reaction, stimulation does not pass immediately through the spinal cord to the muscle but goes to the areas of the cortex before being trans-

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mitted to the muscles. The higher level forms a loop over the simple reflex arc and modifies the resulting movement. The highest level is reached when the arcs of the second level are intricately combined and interlaced by connections with the association areas. Action may then be greatly modified. In terms of consciousness we have deliberation and choice.

An important thing to be noted in the hierarchy of sensorimotor levels is the secondary part played by the cerebral centers midway between the peripheral end-organs and the muscles. To be of value, stimulation must result either in some motor attitude or in a complete reaction, that is, it must influence conduct in some manner. Such conduct may be delayed for years, it may become realised in individuals other than the one in whom the stimulation first operated, in fact, it may work itself out in succeeding generations. But unless conduct is in some way affected, any mediate changes, any cerebral modifications, are practically worthless. Even if only an attitude results, this may take the place of actions more or less definite.

In ordinary processes of reaction, metabolic changes are constantly going on. Intake of food is necessary to supply outgo of waste material, the destruction and decomposition of material is followed by growth and reconstruction. Due to various causes, excessive activity gives rise to fatigue. Inasmuch as fatigue and attention are closely related, the question of fatigue becomes of importance in school work.

(*b*) *Meaning of fatigue.* Muscular contraction and work result in the formation of CO_2. This is due to the oxidisation of the carbon constituents of the muscles. The glycogen also gradually disappears and sarcolactic

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acid is formed. When an excess of CO_2, sarcolactic acid, and acid potassium phosphate is formed, the muscle loses in irritability and contractility, it is less easily stimulated, in other words, it is fatigued. Complete cessation of activity may follow if the fatigue becomes too great. With the accumulation of waste products there is also the decomposition of muscle material from which the energy is obtained. The fatigue by-products do not act direct on either the muscle or the nerve, but affect the motor end-plates.

Fatigue should not be confused with lack of interest, ennui, and the like. Many of the pedagogical experiments on fatigue really measure other things. Conflicting interests, bad seating, lack of proper ventilation, etc., are often at bottom of the child's seeming inability to do work.

(*c*) *Signs of fatigue.* When fatigue is really present, the finer motor coördinations are not possible and there is a general slackness and listlessness in the body attitude as a whole. The eyes wander, the face assumes an aimless, blank expression, and the head becomes less rigid and erect. Response is less accurate and correct. Mental confusion may be shown in memory work, mental calculations, associations, and the like. There may be present a loss of emotional stability and a general state of fidgetiness and mental irritability. Emotional outbursts, hysterical laughter, or uncontrolled spasms may result.

(*d*) *Causes of fatigue.* Anything which lowers the vitality of the system, which prevents the removal of waste material, or increases waste matter more quickly than it can be removed, will induce a condition of fatigue. Under normal conditions fatigue is produced

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by the excessive use of any muscle, organ, or brain center. Continued stimulation without intervening periods of rest will finally result in a total lack of co-ordinated response. Improper ventilation and lack of nourishment predispose to fatigue both by lowering the vitality of the system and by interfering with the normal removal of waste matter. Strong emotions, too, have a weakening effect on the entire system.

(*e*) *Means of relieving fatigue.* Means of relieving fatigue are also means of arresting fatigue. Rest and pause, with interchange and variation in the school work will afford relief. What has been suggested in connection with the daily program is apropos. Five-minute drills, recesses, exercise, games, etc., will afford rest. Ventilation in the home, feeding of children in the school, and child labor outside of school should receive the attention of the school.

5. **Objective aspect of attention.** The motor adjustments and attitudes, the ideal reinforcement, etc., result in qualitative and quantitative changes in the field under attentive control.

(*a*) *Qualitative.* In attention, the object or situation becomes more distinct and clear. An object is distinct when it is set sharply against a background, when its outline is sharply distinguished. Clearness refers to the parts within the whole. The object becomes clear when the parts stand out and become illuminated as it were. An object which is distinct and clear is said to occupy the center or focus of the attentive field. The vague, indistinct, and dim background is called the margin. It should be remembered that it is not the mental state which is clear and distinct, but rather the content, the object or situation under

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control. Persistence may also be considered a phase in the qualitative aspect. The object stays longer in the focus, and slips less readily out of the center of control.

(*b*) *Quantitative.* The more intense and concentrated attention becomes, the more narrow and restricted grows the situation involved. The number of objects which can occupy the focus of consciousness becomes less. One or two objects seem to be the maximum amount which can be attended to fully. When more objects seem to occupy the attentive field, they are grouped in number wholes, or are counted afterwards.

(*c*) *Facilitation and arrest.* Three factors to be considered in questions of facilitation and arrest, distraction, etc., are time, extent of the given field, and error. Attention is said to be facilitated when less time is taken, when more can be controlled within the given time, or when fewer errors are made. When the reverse is true, attention is said to be arrested. The conditions which facilitate or arrest attention may briefly be stated.

(*1*) *Simplicity* versus *complexity.* An object which is complex will hold attention longer than one which is simple. A simple object, on the other hand, will be more readily and more rapidly controlled.

(*2*) *Pleasure-pain.* A situation which is pleasurable will tend to persist in the focus of attention. A painful situation will hold attention for a much shorter time.

(*3*) *Quality of the impression.* An impression which is sharp and intense will stimulate attention more readily than one which is moderate or confused.

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(*4*) *Time.* When more time is allowed, attention will result in greater clearness and distinctness than when less time is allowed. A more complex field, too, may be controlled and fewer errors made.

(*5*) *Age.* As children grow older they can attend to more complex situations and for a much longer time.

(*6*) *Preadjustment.* An individual can attend much better if he is prepared for what is to come, if he has his end-organs set in the right direction, and if he can take the appropriate attitude.

(*7*) *Reinforcement.* If the new situation can connect with the individual's personal history, it will persist longer in the focus of consciousness.

(*8*) *Practice.* Attentive control is facilitated when the individual has exercised in a way suited to the new conditions, when some of his adjustments have become more automatic. Practice enables one to attend more easily, more accurately, and more rapidly.

(*9*) *Fatigue.* Fatigue arrests attention. Fatigue results in (1) increase in reaction time, (2) increase in error, (3) decrease in the amount of work, and (4) arrest of the effects of practice.

(*10*) *Pause and rest.* Pause is usually favorable to attention. If the pause is not too long, (1) the fatigue effects pass away, (2) the practice effects still remain, and (3) the impulse to work is still present. In rest there is danger that the practice effects and the impulse to attend may be weakened. If easy work or work of a different nature is interpolated after difficult work, attention to the latter is facilitated when it is again taken up.

(*11*) *Hunger.* Hunger arrests attention, especially in work of new or difficult nature. The fact that

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underweight children are, on the average, in the lower grades also emphasises this fact.

(*12*) *Obstructed breathing.* Obstructed breathing arrests attention in much the same way that hunger does.

(*13*) *Weakmindedness.* Children who are mentally weak or defective can attend for only very short periods. Their attention to written and more abstract work is marked by wandering movements of the head, and pauses at the end of three or five minutes.

(*14*) *Extraneous stimulation.* When two activities strive both to hold the center of attention, each will interfere with the other. More can be accomplished in a given field, when attention is concentrated on that field.

6. **Definition of attention.** Attention is a process of sensorimotor control which results in increased clearness, distinctness, and persistence of the given situation.

7. **Stages of attention.** The chief forms of attention are (1) primary, (2) assimilative, and (3) secondary.

(*a*) *Primary.* In instinctive attention, some external impression bursts in upon the senses and produces reflex and automatic action. A sharp report, a sudden touch, a vivid flash, may result in a series of coördinations which tend to fixate the stimulating object. The motor aspect of attention is emphasised. The characteristics of primary attention are (1) the external nature of the stimulus, (2) the instinctive nature of the response, and (3) the lack of conscious direction and guidance.

(*b*) *Assimilative.* When the external impression is reinforced by motor manipulation or by ideal revival

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we have assimilative or apperceptive attention. As soon as sufficient experience has been acquired, any impression which excites instinctive behavior will receive further support from mental dispositions and attitudes which have been developed. Assimilative attention agrees with primary in that stimulation is chiefly external. It differs from primary attention in that further interpretation and direction follow and allow the situation to persist in the center of consciousness.

(*c*) *Secondary.* In secondary or voluntary attention there are usually present (1) an end which has been selected in the course of experience, (2) a series of means which connect the future with the present, and (3) a sense of effort felt in the realisation of the means. Attention to the means tends to persist because of their connection with an end felt as valuable. Should the means be disagreeable, attention will still persist if the end is considered of worth. The means, however, need not be disagreeable. The chief aspect in voluntary attention is the persistence with which the means remain in the center of control.

§ IV. Attention in the Classroom

1. **The given situation.** Before the pupil can attend, he must have something to which he can attend. True as this is, it is a rule most commonly violated. Verbalism allows of little reactive behavior. Visual attention is similarly incomplete. Whenever possible, each pupil should have under his immediate control some object or material with which he can work. This may be pencil paper, but it may also be clay, cardboard, scissors, color, brush, and the like. The teacher

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usually does too much of the work himself. Solving of problems in arithmetic, filling in of maps, arranging of topical outlines, expansion of outlines, etc., are some of the activities which will allow of full reactive behavior. Modeling, paper folding, construction work, cutting, etc., may be used in almost all of the subjects.

2. **Simplicity.** The work of the term should be carefully outlined, week by week. In addition the teacher should carefully plan his work for each day. Such daily outline or plan should include, (1) a series of topics, (2) type sentences, problems, experimental data, etc., and (3) mention of the phase of method to be used, whether development, review, test, or drill. The teacher who has no plan, or who is satisfied to 'carry his work in his head' may be regarded as fit for close supervision and inspection. In fact his control will usually be found either weak, or excessively repressive.

3. **Quality of the impression.** To secure clean-cut presentation the teacher should see that his boards are well cleaned and inked, that the ink is fresh and free from dirt, that his supplies are arranged for the day's work, that his text-books are well kept by the children, and that his expression is well articulated and clear.

4. **Time.** Time should be allowed for proper development of a topic, time should be allowed for review of the same topic, and time should be given for a thorough drill on it. The object of instruction is not to hurry through a course of study, but to present thoroughly basic aspects of the different subjects.

5. **Preadjustment.** Directions to the class should be given in sharp, clear tones. Each direction should

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be followed before the next one is given. A slight pause should follow each order to the class. Fixation should be facilitated by having a proper model before the children, by calling their attention to specific aspects of it, by pointing to the parts which are essential, and so on. A series of rapid questions will aid in holding the attention of the children to the subject in hand.

6. **Ideal reinforcement.** Have the boards covered with work as soon as the children enter the room. Examples in arithmetic, sentences in grammar or dictation, a colored map or design, lists in spelling, topical outlines in history, etc., will indicate to the pupil and prepare him for the day's work. Home work should not be given till the end of the day. In the process of instruction the teacher should use the experiences of the children and objects in the immediate environment in making clear the topics of the lesson. The streams in the gutter, the lakes in the parks, the stones in the school and neighboring buildings, the foods eaten by the children, the number work needed in the home, the shop, and the business, etc., these should be employed for purposes of illustration. Words in spelling should be selected from the reading of the grade. Composition should be based on work which the children have had, and in which they are proficient. That mental background should be used which will best serve to hold the topic in the focus of attention.

7. **Practice.** The rules for drill have been given in the first volume. The teacher should leave no topic till definite drill has been given, till the pupils have been exercised in the work for one or more periods. Basic elements in number and language may require drill for a whole term.

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8. **Fatigue and pause.** The rules which should govern the arrangement of the daily program have been discussed in a preceding chapter. Means of relieving fatigue have also been presented above.

9. **Hunger, underfeeding, and obstructed breathing.** The teacher can only advise and urge proper feeding of children and medical treatment. If possible, the school might be made a center for the distribution of milk at cost. As is now well known, soup is rather a stimulant and has little nutritive value. 'Soup kitchens' fail, therefore, in properly nourishing those who use them.

10. **Weakmindedness.** Feeble-minded children should be placed in a special class. Manual aids should be called in and only the simplest topics should be presented. Lesson periods should be very short, and intermissions for play and social activities should be allowed.

11. **Extraneous stimulation.** The pupil should see what the day's work is as soon as he enters the classroom. The blackboard should be covered with suggestive work. During the process of instruction any material not connected with the lesson should be out of the pupil's reach. There should be no halts due to missing pencils, empty ink wells, etc. Directions to pass papers, put pencils down, etc., should be obeyed by all before further directions are given or new work presented.[4]

[4] For a full discussion of the different aspects of attention, and of its application in the classroom, see, Arnold, F., *Attention and Interest, A Study in Psychology and Education.*

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CHAPTER IV

THE HEALTH OF THE CHILD

§ I. Duty of the Principal

In caring for the health of the children of the school the principal must do much more than is usually required. Some factors, as posture, exclusion of affected children, two-minute drills, and the like are important. Other factors, as the feeding of children, directions to parents in this connection, measurement of the growth of children, consideration in instruction for physical weaknesses due to improper feeding, and the like are equally important. Such a matter as the underfeeding of children requires considerable attention. It is a feature of school life which can not be removed by a majority vote of a school board. And when experiments on the effects of hunger on mental activity show that in memory the results fall as low as from .20 to .50 of the normal during periods of hunger, it is seen that (1) some consideration should be shown to children who are underfed, *i.e.*, not so much should be demanded of them, or (2) some effort should be put forth by the school to improve conditions either by instruction or by actual aid.[1] The same is true in the case of children who are under weight or under size.

In making an effort to improve the feeding of children the principal can work only indirectly. In parents'

[1] See, Weygandt, Wilhelm, 'Ueber die Beeinflussing geistiger Leistungen durch Hungern,' *Psych. Arbeiten*, 4, 1904.

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meetings he can stir the parents and induce some of them to pay more attention to the feeding of their children. He should suggest cheap and nutritious foods. A notice might be printed and sent to the parents. In this manner they might receive some instruction on food values, cost of foods, digestibility, and the like. Similar steps should be taken in the matter of clothing. Parents may be instructed on the necessity of covering the more susceptible portions of the body. As regards the diseases of children the principal can not be expected to take the place of the school physician. He should, however, be able to suggest precautions, advise parents of the proper diet, exercise, and home hygiene, and pick out such children as seem to be ailing or diseased.

§ II. Dietetics

1. **Food elements.**[2] Food is necessary for two purposes, (1) to form tissue and to repair it, and (2) to produce energy and heat. Tissue-forming elements are (1) proteins, (2) mineral matters, and (3) water. Energy- and heat-producing elements are (1) proteins, (2) albuminoids, (3) carbohydrates, and (4) fats. Of these the proteins, as, casein, myosin, gluten, and legumen, and the albuminoids, as, gelatin, are nitrogenous, and the carbodydrates, as, sugar and starch, and the fats, as, olive oil and butter, are non-nitrogenous. The inorganic mineral matters include sodium, potassium, lime, phosphorus, and chloride.

Tissue can be formed by proteins, mineral matter,

[2] See: Carpenter, Frank O., *Foods and their Uses; Practical Physiology*, by Beddard-Edkins-Hill-Macleod, Pt. II., Ch. X; Hutchison, R., *Food and the Princ. of Dietetics*, Ch. I.

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and water, and by these alone. Albuminoids though much like proteins are of no use for this purpose. In the matter of heat and energy, carbohydrates, proteins, and fat are of value in the order named. Proteins alone it will be observed are able both to form tissue and to produce heat. Albuminoids are not found to any great extent in raw foods. They resemble the proteins in composition but act like the carbohydrates in producing heat and energy. If a mixed diet is used the carbohydrates act as protein sparers. They supply heat and energy and so allow the proteins to form tissue. If carbohydrates are not present in the food the proteins must assume both functions. Besides being a tissue-former, protein acts as a general tonic to the system. A body well supplied with proteins has greater vitality and energy, and a high resisting power to fatigue and disease. The tone of the blood, muscles, and vital organs is also increased.

The amount of protein, carbohydrate, and fat required in the food daily is 125 gr., 500 gr., and 50 gr. respectively. The ratio between these three may be formed on the basis of 2.5 : 10 : 1, that is, ten times as much carbohydrate as fat, and four times as much carbohydrate as protein. Such ratios vary slightly according to the nature of the work done.

2. **Food values.** Food elements exist in different amounts in the various foods, and in different degrees of absorbability.

(*a*) *Food constituents.* The usual foods from which we derive proteins are meat, fish, milk, and eggs. In meat the protein exists as myosin, in milk as casein, and in eggs as albumin. Beans, peas, and lentils are also rich in protein in the form of legumin. Carbo-

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hydrates are obtained from the various vegetables, from fruit, from bread, from cereals, from sugar, and from tubers. Fat is found in fat meats, in butter, in the yolk of eggs, and in the various oils.

The relative value of the various foods can be determined by (1) the percentage of nutritive constituents contained in the food, (2) the potential energy which it can yield, (3) the ease with which it can be digested and absorbed, and (4) its cost.

(*b*) *Ratio of constituents.* The ratio of protein to carbohydrate should be about 1 : 4. Protein foods, as meat, cheese, etc., must therefore be supplemented by bread, green vegetables, fruit, and the like. Carbohydrate foods on the other hand must receive some backing by the addition of meat, cheese, milk, beans, etc.

(*c*) *Potential energy.* The potential energy of a food is measured in calories. A calory is the amount of heat which in necessary to raise the temperature of a liter of water 1° C. The value in calories of any food is measured by the number of liters which 1 gr. of the food will raise 1° C. in temperature. If we compare the food elements in this connection we find that 1 gr. of each of the food elements will yield heat as follows: protein, 4.1 calories, carbohydrate, 4.1, and fat, 9.3. If then we take 100 gr. of any food, find the number of parts, protein, carbohydrate, and fat, we can get the value of the food in calories by multiplying the number of grams of protein matter by 4.1, of carbohydrate by 4.1, and of fat by 9.3. The sum will give the total fuel value *per* 100 grams.

(*d*) *Nutritive value.* The digestibility and absorbability of foods must also be considered. Of the pro-

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teins, those from meat, fish, eggs, and milk are most completely absorbed, while the nitrogenous matter in vegetables undergoes considerable waste. Fats are almost wholly absorbed, especially when the melting point is low as in the case of butter and bacon. Carbohydrates are more completely absorbed than any other food elements. Foods which consist almost wholly of carbohydrates, as rice and sugar, leave little residue in the intestines. Perfect absorbability, however, is not always to be desired. To stimulate intestinal action and to prevent intestinal irritation and disturbance, a certain residual ballast is needed. Green vegetables and bread are therefore needed because of the waste which they yield.

(*e*) *Cost.* An important factor is the cost of food. The following tables give some idea of how money may be invested in food. The cost of the food in each case is one shilling.

Food	Protein (Gr.)	Energy (Calories)[3]
Bread	283	10 764
Peas	572	8 921
Potatoes	54	3 796
Milk	114	3 000
Butter	3.5	2 884
Apples	27	2 856
Cheese	272.5	2 638
Cod	218	953
Eggs	79	839
Lean beef	127	829

[3] See *A System of Medicine*, edited by T. C. Allbutt and H. D. Rolleston, 1, 'The Physiological Principles of Dieteties,' by R. Hutchison.

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The differences in these values it should be noted is due not to the foods as such but to the amount of each which can be purchased for a shilling. Eggs and beef, for example, are excellent foods but their expense places them low on the list when economy is considered.

(*f*) *Reference tables.* To facilitate reference and comparison the following tables are given. Different investigators usually vary slightly in the values which they find, but they agree in general in their approximate values. The amount of heat or energy in calories *per* 100 grams of each food can be obtained by multiplying the parts *per* 100 of protein by 4.1, of carbohydrate by 4.1, and of fat by 9.3, and adding the results.

Food	Protein	Carbo.	Fat	Salts	Water
Mammals					
Beef, average	20.96	0.46	5.41	1.14	72.03
Beef, lean	20.71	——	1.74	1.18	76.37
Beef, fat	16.75	——	29.28	0.92	53.05
Beef, sirloin	19.17	——	5.86	1.38	73.48
Beef, steak	20.40	0.40	1.97	1.90	74.70
Beef, roast	22.9	0.5	5.19	1.00	70.00
Veal, fat	18.88	0.07	7.41	1.33	72.31
Veal, lean	19.86	——	0.82	0.50	78.84
Mutton, fat	16.62	0.54	28.61	0.93	53.31
Mutton, average	17.52	0.40	5.23	1.25	74.90
Pork, fat	14.54	——	37.34	0.72	47.40
Pork, lean	20.25	——	6.81	1.10	72.57
Ham, smoked	25.00	——	36.50	10.00	27.00
Horse	21.71	0.46	2.55	1.01	74.27
Hare, leg	23.14	——	1.97	1.19	74.60
Birds					
Fowl, fat	18.49	1.10	9.34	0.91	70.06
Fowl, lean	19.72	1.27	1.42	1.37	76.22
Turkey	24.70	——	8.50	1.20	65.60
Goose	15.91	——	45.59	0.49	38.02
Pigeon	22.14	0.76	1.00	1.00	75.10
Duck, wild	23.80	1.69	3.69	0.93	69.89
Fish					
Salmon	21.60	——	12.72	1.39	64.29
Shad	18.76	——	9.43	1.35	70.44

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Food	Protein	Carbo.	Fat	Salts	Water
Fish					
Haddock	16.93	—	0.26	1.31	81.50
Cod	16.23	—	0.33	1.36	72.25
Sturgeon	18.08	—	1.90	1.43	78.59
Sole	17.26	—	0.81	0.87	79.20
Trout	17.52	—	0.74	0.80	80.50
Herring, salted	18.90	1.57	16.89	16.41	46.23
Cod, salted	27.07	—	0.36	22.10	50.54
Accessory parts					
Bacon, salt	9.12	—	75.75	—	9.15
Tripe, pork	23.00	—	11.32	0.84	63.84
Liver, calf	17.66	—	2.39	1.68	72.80
Egg					
Whole	12.55	0.53	12.11	1.12	73.67
White	12.87	0.77	0.25	0.61	85.50
Yolk	16.12	0.48	31.39	1.01	51.03
Milk					
Human	2.29	6.21	3.78	0.31	82.41
Cow's	3.66	4.48	3.62	0.68	87.22
Mare's	1.89	6.65	1.09	0.31	90.06
Preserved, with sugar	11.79	50.06	10.35	2.19	25.61
Pres., without sugar	11.92	14.49	12.42	2.18	58.99
Cream	3.76	4.23	22.66	0.53	68.82
Butter	0.8–3.6	—	83.10	0.07–3.6	6.–20.
Cheese					
American	32.90	—	31.00	4.5	26.90
Cream	8.60	—	35.90	1.50	32.00
Dutch	28.21	2.50	27.83	4.86	36.60
Brie	18.97	0.83	25.87	4.54	49.79
Cheshire	27.68	5.89	27.46	5.01	33.96
Roquefort	25.25	1.90	30.61	5.39	36.85
Parmesan	41.19	1.18	19.52	6.31	31.80
Molluscs, Crusacea					
Oysters	8.70	—	1.43	2.04	80.50
Mussels	11.20	—	1.21	1.30	82.20
Snails	16.10	—	1.08	1.55	79.30
Lobster	18.13	—	1.07	2.47	77.70
Bread, cereals, etc.					
Wheat bread	7.00	46.–55.	0.85	0.6–1	33.–40.
Rye bread	6.11	46.94	0.43	1.46	42.27
Whole grain bread	7.59	41.87	1.51	1.42	43.43
Macaroni	10.98	76.05	0.45	0.64	11.60
Oatmeal	14.70	69.80	6.20	1.50	7.80
Hominy	8.20	78.90	0.60	0.40	11.90
Pop-corn	10.70	78.70	5.00	1.30	4.30
Barley	5.13	81.87	0.97	1.93	10.10
Rice, boiled	5.00	41.90	0.10	0.30	52.70

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Food	Protein	Carbo.	Fat	Salts	Water[4]
Seeds, etc.					
Green peas	4.00	16.00	0.50	1.40	78.10
Dried peas	18.9–24.5	52.2–61.1	1.2–1.4	2.2–3.5	10.6–14
Beans, dried, haricot	13.8–25.	52.9–60.	1.95	2.3–4.	10.–20.
Broad beans	22.26	57.50	1.50	2.50	13.00
Lentils, dried	20.3–26.8	56.–62.	2.4–1.5	2.–2.66	11.–13.
Tubers					
Potato	1.30	20.00	0.15	1.00	76.00
Potato, sweet	1.50	16.50	0.30	2.60	67.50
Vegetables					
Cabbage	1.89	4.87	0.20	1.23	89.97
Carrot	1.23	9.17	0.30	1.02	86.79
Turnip	1.54	8.32	0.21	0.91	87.80
Spinach	3.49	4.44	0.58	2.09	88.47
Salad, endive	1.46	1.58	0.13	0.78	94.13
Asparagus	1.79	2.63	0.25	0.54	93.75
Cauliflower	2.48	4.55	0.34	0.83	90.89
Truffles, black	8.60	8.10	0.62	2.31	72.80
Mushroom, field	3.74	3.51	0.15	0.48	91.28
Cane sugar, brown	0.35	95.11	——	0.76	2.16
Honey	0.76	74.64	——	0.25	30.60

	Soluble					Insoluble	
Fruits	Prot.	Acid	Sugar	Pectic Bodies	Water	Stone, Skin	Ashes Pectoses
Apple	0.36	0.82	7.22	5.42	84.79	1.51	0.49
Peach	0.65	0.92	4.48	7.17	80.00	6.06	——
Pear	0.36	0.20	8.26	3.54	83.80	4.30	——
Prune	2.25	2.75	44.90	4.48	29.30	——	1.37
Plum	0.38	0.53	3.97	10.07	79.40	4.99	——
Grape	0.59	0.79	14.36	1.96	78.17	3.60	0.30
Raisin	2.42	2.52	54.56	——	32.00	1.72	1.21
Straw-berry	0.54	0.93	6.28	0.48	87.70	2.85	0.81
Fig	4.01	——	49.79	——	31.20	——	2.86
Date	0.20	——	61.00	——	——	——	——

From an educational point of view a few things are of interest. Of the meats it is to be noted that the

[4] From Gautier, A., *Diet and Dietetics*, Eng. Tr. by J. Rice-Oxley, Ch. XI.

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more expensive meats are by no means the most nutritious. When, moreover, we consider the waste in bone, trimming, etc., in the higher priced steaks, we must acknowledge that the cheaper cuts are to be preferred. Horse meat, it is seen, is as nutritious as beef. With the increase of mechanical means of locomotion, a new use of the horse may be made.

Of the different kinds of bread white bread is to be preferred to the rye breads, to whole wheat breads, and to the various patent breads. Rye and other breads increase intestinal action but are inferior to white bread. In Europe rye is eaten because it is raised more than is wheat. The foreign population, therefore, tends to cling to the bread of its youth. The weight of such bread moreover leads the ignorant to believe that their money is better expended when spent for rye and similar bread.

The cheapness and rich food qualities of beans, peas, and lentils is to be observed. Beans contain sulphur and if eaten to excess produce flatulence. When expense is considered these foods contain more protein for a given expenditure than eggs or meat.

(*g*) *Time of absorption.* The following table gives the periods of time necessary for the absorption of the different foods by the intestines.

The foods which pass most quickly into the intestines are those in liquid form. Milk, soft boiled eggs, cooked vegetables, boiled fish, and bread are most digestible. Most difficult to digest are the meats and fat or oily fish. In this connection it may be remarked that clear soup has practically little nourishing matter in it. When meat is boiled a very small amount of protein coagulates and floats to the top as scum, some of the

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Food	Grams	Hours	Food	Grams	Hours[5]
Water	100–200	1–2	Eggs, omelette	100	2–3
Coffee	200	1–2	Fish, boiled	200	2–3
Weak tea	200	1–2	Fish, salted	200	4–5
Coffee with cream	200	2–3	Potatoes, cooked	150	2–3
Cocoa with milk	200	1–2	Cauliflower, cooked	150	2–3
Gravy soup	200 cc.	1–2	Rice, cooked	150	3–4
Cooked beafsteak	100	3–4	Turnips, cooked	150	3–4
Roast beef	250	4–5	Carrots, boiled	150	3–4
Raw beef	250	3–4	Spinach, boiled	150	3–4
Ham	160	3–4	Beans	150	4–5
Roast goose	250	4–5	Peas, mashed	200	4–5
Roast duck	250	4–5	Lentils, mashed	150	4–5
Roast chicken	250	3–4	Raw salad	150	3–4
Roast pigeon	195	3–4	White bread	70	2–3
Milk	100–200	1–3	Rye bread	150	3–4
Eggs, soft	100	1–2	Apples	150	3–4
Eggs, hard	100	2–3	Cherries, stewed	150	2–3

connective tissue is dissolved in the form of gelatin, a small amount of fat is dissolved, and a large amount of extractives and mineral matter is taken out. The taste goes into the soup and the nutritive qualities remain in the meat. The value of clear soup lies in its stimulating qualities. It promotes the flow of gastric juice. If soup is to be made nourishing it should be thickened with vegetables, peas, beans, or lentils. Even in such a case, however, the nutritive value of thick soup is not as much as that of a slice of bread. Meat extracts likewise can be regarded simply as stimulants to digestion and not as foods. One pound of extract may be equal to 34 pounds of meat in its flavoring ingredients but not in its protein elements. Beef juices prepared cold, however, contain considerable protein matter.

[5] From Gautier, A., *Diet and Dietetics*, Ch. V. See also, Bailey, E. H. S., *A Text-book of Sanitary and Applied Chemistry.*

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3. **Feeding of children.** A most difficult problem is that of the nervous, irritable, and underfed children in the school. They may constitute only a small portion of the total register but they usually exist in numbers sufficient to require special consideration.

(*a*) *Underfeeding.* Many children who are really underfed are not considered so by their parents or by the teachers. Many parents look upon bread and tea as a normal breakfast, and view eggs or cheese or meat as an extravagance. Children are often fed in the morning and at evening with tea or coffee and bread, and receive meat or other protein food at noon, if at all. In the morning a child should receive a cup of milk, a slice or two of bread with butter or syrup and an egg, or instead of egg, some meat or a cup of oatmeal with milk, or peas, lentils, or beans. A similar meal should be given at evening. The lunch at twelve should consist of meat, vegetables, potatoes, bread, water, and fruit. These are very general directions. It is safe to follow the child's appetite so long as he eats enough protein food with the carbohydrate and other foods. Something more than weak tea and bread should be given to the child in the morning and at evening. Certain investigators in Edinburgh came to the conclusion, "that in order to improve the dietary of the laboring classes the following principles should be instilled into them:

(1) That a diet of tea and bread or of tea, bread and butter (the lazy diet) is faulty.

(2) That the faults of the tea and bread diet can be corrected by the free use of meat, eggs, or other animal food, but that this mode of correction is expensive.

(3) That the faults can also be corrected by the free

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use of oatmeal with milk, or of peas and beans, without extra cost." [6]

(*b*) *Requirements.* Exact requirements in the feeding of children are given in the following tables:

Age	Protein	Fat	Carbo. [7]
5	56 gr.	43 gr.	145 gr.
8–9	60	44	150
12–13	72	47	245
14–15	79	48	270

Age	Weight	Per Day and per Kg. of Weight			Calories per Kg. [8]
		Protein	Fat	Carbo.	
4	15.1 Kg.	3.8	3.0	10.0	84.5
6	18.0	3.1	2.2	10.0	74.2
10	26.1	2.5	1.6	9.0	61.0
14	40.5	2.0	1.0	7.5	48.3
20	65.0	1.8	0.9	6.0	44.5

Of the proteins at least one third should come from animal food. Vegetable proteins should be derived from oats, wheat, maize, lentils, etc. Children usually dislike fat. If given in the form of gravy, milk, yolk of egg, or of butter on bread, in mashed potatoes, pudding, etc., it is more acceptable. Of the carbohydrates, starch may be obtained from rice, sago, potatoes, etc., and sugar from jams, honey, clean candy, or fruit. Jam, however, should not take the place of butter on bread. Butter is necessary because of the

[6] Hutchison, R., *Food and the Princ. of Diet.*, 56.
[7] *Ibid.*, 469.
[8] Gautier, A., *Diet and Dietetics*, 389.

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importance of fat in the child's diet. Of the essential minerals, lime, potash, and phosphoric acid are found in milk and eggs, iron is found in red meat, egg yolk, and oatmeal, and potash in fruit and green vegetables. Pure water and milk should be the drinks of children. Tea or coffee should not be given to them. If they have already formed the habit the tea or coffee should be diluted with milk. Cocoa made with plenty of milk is also beneficial.

(*c*) *Measurements of growth.* The nutrition of a child can usually be seen by his growth and height. The following tables form standards by which comparisons can be made:

WEIGHT OF BOYS AND GIRLS[9]

AGE	LBS.		ABS. ANNUAL INC.		ANNUAL INC., PER CENT	
	Boys	Girls	Boys	Girls	Boys	Girls
6½	45.2	43.4	——	——	——	——
7½	49.5	47.7	4.3	4.3	9.5	9.9
8½	54.5	52.5	5.0	4.8	10.1	10.0
9½	59.6	57.4	5.1	4.9	9.3	9.3
10½	65.4	62.9	5.8	5.5	9.7	9.6
11½	70.7	69.5	5.3	6.6	8.1	10.5
12½	76.9	78.7	6.2	9.2	8.7	13.2
13½	84.8	88.7	7.9	10.0	10.3	12.7
14½	95.2	98.3	10.4	9.6	12.3	11.9
15½	107.4	106.7	12.2	8.4	12.8	8.5
16½	121.0	112.3	13.6	5.6	12.7	5.2
17½	——	115.4	——	3.1	——	2.8
18½	——	114.9	——	——	——	——

[9] From Hall, G. S., *Adolescence*, 1: 8. Table is based on 69000 observations by Burk.

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WEIGHT OF BOYS AND GIRLS [10]

AGE	BOY		GIRL	
	Kilos	Lbs.	Kilos	Lbs.
6	19.66	43.2	18.76	41.3
7	21.67	47.7	20.82	45.8
8	23.91	52.6	22.71	50.0
9	26.08	57.4	25.07	55.1
10	28.49	62.7	27.43	60.3
11	31.26	68.8	29.93	65.8
12	33.45	73.6	33.17	73.0
13	35.96	79.1	38.29	84.2
14	40.34	88.7	43.12	94.9
15	47.25	103.9	46.90	103.2
16	52.10	114.6	50.06	110.1

HEIGHT OF BOYS AND GIRLS [11]

AGE	HEIGHT IN INCHES		ANNUAL INCREASE, INCHES		ANNUAL INCREASE, PER CENT	
	Boys	Girls	Boys	Girls	Boys	Girls
5½	41.7	41.3	2.2	2.0	5.3	4.8
6½	43.9	43.3	2.1	2.4	4.8	5.5
7½	46.0	45.7	2.8	2.0	6.1	4.4
8½	48.8	47.7	1.2	2.0	2.5	4.2
9½	50.0	49.7	1.9	2.0	3.8	4.0
10½	51.9	51.7	1.7	2.1	3.3	4.1
11½	53.6	53.8	1.8	2.3	3.4	4.3
12½	55.4	56.1	2.1	2.4	3.8	4.3
13½	57.5	58.5	2.5	1.9	4.3	3.2
14½	60.0	60.4	2.9	1.2	4.8	2.0
15½	62.9	61.6	2.0	0.6	3.2	1.0
16½	64.9	62.2	1.6	0.5	2.5	0.8
17½	66.5	62.7	0.9	—	1.4	—
18½	67.4	—	—	—	—	—

[10] From Holt, L. Emmett, *The Diseases of Infancy and Childhood*, 19. Table is based on 14744 observations by Porter.

[11] From, Hall, G. S., *Adol.* 1:7. Table is based on over 40000 observations summarised by Boas.

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HEIGHT, WEIGHT, CIRCUMFERENCE OF CHEST AND HEAD OF BOYS AND GIRLS [12]

AGE	SEX	WEIGHT		HEIGHT		CHEST		HEAD	
		Lbs.	Kg.	Inch.	Cm.	Inch.	Cm.	Inch.	Cm.
5	Boys	41.2	18.71	41.7	106.0	21.5	54.8	20.5	52.2
	Girls	39.8	18.06	41.4	105.3	21.0	53.5	20.2	51.3
6	Boys	45.1	20.48	44,1	112.0	23.2	59.1	—	—
	Girls	43,8	19.87	43,6	110.9	22.8	58.3	—	—
7	Boys	49.5	22.44	46.2	117.4	23.7	60.6	—	—
	Girls	48.0	21.78	45.9	116.7	23.3	59.5	—	—
8	Boys	54.5	24.70	48.2	122.3	24.4	62.2	—	—
	Girls	52.9	24.01	48.0	122.1	23.8	60.8	—	—
9	Boys	60.0	26.58	50.1	127.2	25.1	63.9	—	—
	Girls	57.5	26.10	49.6	126.0	24.5	62.5	—	—
10	Boys	66.6	30.22	52.2	132.6	25.8	65.6	20.1	53.5
	Girls	64.1	29.07	51.8	131.5	24.7	63.0	20.7	52.8
11	Boys	72.4	32.83	54.0	137.2	26.4	67.2	—	—
	Girls	70.3	31.87	53.8	136.6	25.8	65.8	—	—
12	Boys	79.8	36.21	55.8	141.7	27.0	68.8	—	—
	Girls	81.4	36.90	57.1	145.2	26.8	68.3	—	—
13	Boys	88.3	40.04	58.2	147.7	27.7	70.6	—	—
	Girls	91.2	41.36	58,7	149.2	28.0	71.3	—	—
14	Boys	99,3	45.03	61.0	155.1	28.8	73.3	—	—
	Girls	100.3	45.50	60.3	153.2	29.2	74.1	—	—
15	Boys	110.8	50.26	63.0	159.9	30.0	76.6	21.8	55.5
	Girls	108.4	49.17	61.4	155.9	30.3	76.8	21.5	54.8
16	Boys	123.7	56.09	65.6	166.5	31.2	79.2	—	—
	Girls	113.0	51.24	61.7	156.7	30.8	78.8	—	—

The close relation which exists between feeding and growth is emphasised by the superior size and weight of children who come from well-to-do homes. Studies from different countries show this. The following tables need no comment.[13]

HEIGHT OF CHILDREN IN INCHES

AGE	13	14	15	16
Non-laboring class . . .	58.79	61.11	63.47	66.40
Artisan class	55.93	57.76	60.58	62.93
Difference	2.66	3.35	2.89	3.47

[12] From Holt, L. E., *Dis. of Inf. and Child.*, 20.

[13] From Spargo, John, *The Bitter Cry of the Children*, 97. Tables are based on 19000 observations by Roberts.

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WEIGHT OF CHILDREN IN POUNDS

AGE	13	14	15	16
Non-laboring class . . .	88.60	99.21	110.42	128.34
Artisan class	78.27	84.61	96.79	108.70
Difference	10.33	14.60	13.63	19.64

CHEST GIRTH IN INCHES

AGE	13	14	15	16
Non-laboring class . . .	28.41	29.65	30.72	33.08
Artisan class	25.24	26.28	27.51	28.97
Difference	3.17	3.37	3.21	4.11

No one other than the child suffers more from such conditions than the teacher. A child who is ill-nourished lacks the poise and stability of his more fortunate companions. He lacks self-control and initiative, fidgets, becomes irritable under slight provocation, and has not the substratum to enable him to do careful and persistent work. As Hutchison well points out, "A hungry man is an angry man, and the proverbial good nature of the Englishman may, perhaps, be associated with the fact that, as a rule, he is full fed." [14] It is evident that attention, interest, memory, and all that goes with efficiency and work have an extremely weak basis in an underfed or improperly nourished child. Often the child can start with but from eighty to fifty per cent of normal working power.

Milk is a food which deserves special mention. Dr. Ferguson, a factory inspector, 'concluded from careful

[14] Hutchison, R., *Food and the Princ. of Diet.*, 57.

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continuous measurements of factory children that between thirteen and sixteen years of age they grow nearly four times as fast on milk for breakfast and supper as on tea or coffee.'[15] The best milk is that which is less than a day old, that is, which stands only twelve or eighteen hours after it has left the cow. If the milk is older it should be heated or boiled. In the latter case it may be heated to 70° C. (158° F.) for a period of twenty or thirty minutes, or it may be boiled for a few minutes. Boiling is probably the safest process if milk has stood for any length of time. If milk were made as much a gospel as is arithmetic or spelling it would be better for both teacher and child alike.

§ III. Clothing

Feeding and clothing of children should be treated together. If the heat of the child's body is radiated into the air it is just that much energy wasted. The warmth of the body should therefore be preserved. The principal should instruct parents, as suggested in the case of feeding, on the necessity of covering the sensitive portions of the body. These are the extremities, where the blood vessels are exposed, and the abdomen. Sweater, 'Jersey,' woolen gloves, high shoes, jackets closed, etc., are some of the simple means of keeping the body warm.

§ IV. Exercise

The natural form of exercise for children is play. Facilities for play should be provided, as squares or parks arranged for play, public playgrounds, roof

[15] Hutchinson, R., *Food and the Princ. of Diet.*, 472.

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playgrounds, yards, etc. The principal should encourage weekly outings, excursions, athletic contests, etc. School boards should allow at least one school day a month for this purpose. In Germany excursions are made under the supervision of teachers for a number of days. A point to be noted in the exercise of children is the fact that they like to skip about more or less freely. In walking, for example, children naturally run a short distance, turn, gambol and frolic, and act in a manner much different from that of adults. This should therefore be allowed in the school yards and elsewhere when children are playing. Children should form lines only just before they are to pass to their rooms.

More systematic means of exercise are (1) organised games, (2) physical exercise, and (3) short drills between lessons. In the different games there should be some supervision and guidance by the teachers concerned. Special game periods should be allowed, and part of the recess may be occupied with them. Since physical exercise is somewhat fatiguing it should not be indulged in for any great length of time. From five to fifteen minutes is long enough. Drills should be given after each lesson period. Such 'setting-up' exercises should not take more than a minute or two. During all such exercise a fresh supply of air should be provided.

§ V. The Senses

1. **Sight.** Aspects of vision with which principal and teacher are concerned are (1) defective vision, (2) characteristics of printed matter, (3) characteristics of writing, and (4) diseases of vision which are contagious.

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(*a*) *Defective vision.* When a teacher receives a new class the eyes of the children should be tested during the first few days. Children whose right eye is weak should be seated on the left side of the room, those whose left eye is weak should be seated on the right side, and those whose two eyes are weak should be placed near the front of the room.

An eye which is normal is called emmetropic. The near point of a normal eye for children is 7 cm. and the far point from 6 to 10 m. Between these limits objects should be distinctly seen by all children. If vision is defective we may have near-sightedness or myopia, or far-sightedness or hypermetropia. In the former case images from objects at normal distances fall a little in front of the retina. In the latter case such objects throw images behind the retina. On the retina the images become blurred. In the defect of astigmatism part of the field becomes blurred. Thus, if vertical lines are focused, lines perpendicular to them become indistinct, and vice versa. Lines at right angles to one another, therefore, can not be focused.[16] Color blindness is sometimes met with. In such cases the individual may be either red blind or green blind. A red-blind person sees the spectrum as a series of dark greens, blues, and greys. A green-blind person sees the spectrum at the center as a grey.

For ordinary tests Snellen's letters may be used. When one eye is tested light should be shut out of the other eye by a piece of cardboard or other opaque substance. If a pupil stands twenty feet away from the letters he should be able to read the letters marked '20 feet.' If his right eye is normal his record will

[16] See Howell, William H., *A Text-Book of Physiology*, Ch. XVII.

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read, R $\frac{20}{20}$. If, however, at 20 feet the right eye can read letters marked '30 feet,' the record should read, R $\frac{20}{30}$, *i.e.*, the right eye at 20 feet can see letters which a normal eye can see at 30 feet. The left eye should be similarly tested. Seldom will both eyes show the same power. Such tests should be made by the teacher. They should be made on the first or sec-

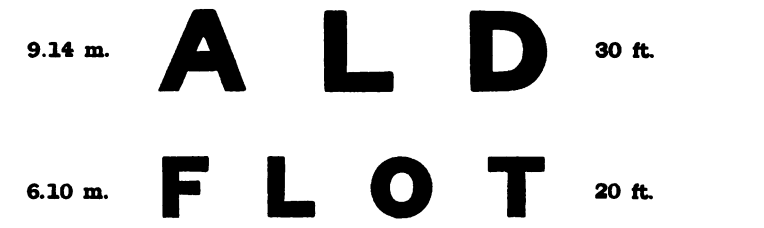

FIG. 10. — Part of Snellen Chart.

ond school day and a record should be kept in the 'roll-book,' or some similar book.

For the testing of color blindness Holmgren's skeins are usually employed.[17] These skeins of wool are three in number and are of the following colors, (1) pale pure green which should not incline towards yellow green, (2) medium purple (magenta), and (3) vivid red. The individual in question is asked to select from a number of differently colored skeins those similar to the three samples given. If any striking errors in matching are made each of the three colors should be used alone. With medium purple, the red-blind will pick out blues and violets in addition to the other purples, while the green-blind will select greens

[17] See Howell, William H., *A Text-Book of Physiology*, Ch. XVII.

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and greys. With vivid red the red-blind will match dull greens, greys, or browns, while the green-blind will select bright greens, greys, or browns. Such testing would form an excellent kindergarten or primary exercise.

(*b*) *Print.* To prevent the development of defective vision only books with print of the right size should be selected for school use. In considering the printed matter of a book the following points should be considered, (1) size of the small letters, (2) spacing between the words, (3) spacing between the lines, and (4) width of the printed page. If we consider as standard such small letters, as, **n, o, e**, we may give the ratio of letter width to word spacing as 1: 1.5, and the ratio of letter height to line spacing as 1: 2. Thus, if the small letters are 1.6 mm. high, the spacing between the lines should be 3.2 mm. The width of the line should not exceed 1 dm. The size of the type should vary with the school year. First-year books should have letters 2.6 mm. high, second- and third-year books, 2 mm., fourth-year books, 1.8 mm. high. No letters should be smaller than 1.5 mm. This applies to all printed matter whether in notes, in questions appended at the end of chapters, etc.[18]

(*c*) *Writing on blackboard.* Writing on the blackboard should be neat and legible, the small letters being at least 35 cm. in height. Vertical writing or print should be used. In the lower grades the letters should be made still larger, as high as 1 dm. if necessary. Children should not be allowed to write on the board for the class to read since their letters are not distinct

[18] See: Shaw, Edward R., *School Hygiene*, 177, 178; Burgerstein, Leo, and Netolitzky, Aug., *Handbuch der Schulhygiene*, 602.

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and lack a firm stroke and strong lines. To form a proper background, boards should be black. They should be washed with ink or black color to prevent grey color from settling.

(*d*) *Writing on slate or paper.* The following aspects of writing on slate or paper should be considered, (1) ruling of the paper, (2) color of the lines, and (3) size of the written letters. If paper is ruled the color of the lines should be black. This is to be preferred to the delicate blue shades which are a strain on the eye. Single lines should be used. For lower grades double lines should be used for (1) body of the letter, (2) upper loop, and (3) lower loop. Thus, **h** has an upper loop, **g** a lower loop, and **a** would correspond to the body of **g**. No small letter should be written less than 3 mm. high, while 5 mm. should be the upper limit of small letters. When letters are made larger, they require painful drawing on the part of the child. Large or capital letters should be 1 cm. or less. The following tables indicate standards of line spacings for the different school years:

Slate or Lead Pencil		Pen and Ink	
First year	8¼ 5½ 8¼ mm. = 22 mm.	First year	6 4 6 mm. = 16 mm.
Second Third year	6 4 6 mm. = 16 mm.	Second year	5¼ 3½ 5¼ mm. = 14 mm.
Fourth year	Single lines with space of 14 mm.	Third year	4½ 3 4½ mm. = 12 mm.
		Fourth year *	7½ 5 mm. = 12½ mm.
		Fifth Eighth year	Single lines with space of 12 mm.

* (In fourth year, pen and ink, there is only a lower loop line. Body and upper loop have space of 7½ mm.)

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The first figure refers to the space for the upper loop, the second figure refers to the space for the body of the letter, and the third figure refers to the space for the lower loop.[19] For kindergarten and infant classes the body of the small letter should be from 6 mm. to 1 cm. In practice work, too, the letters may be a millimeter or so larger from the standard. The large letters sometimes seen in higher primary classes are painful drawings and hardly penmanship exercises.

(*e*) *Diseases of the eye.* If a child's eyes, etc., show redness, swelling, sores, inflammation, watery discharges, sticky secretions, and the like, further examination by a nurse or physician should be required. The most common of the eye troubles are trachoma or 'granulated lid' and conjunctivitis. Trachoma is characterised by the formation of granules in the membranous linings of the lids, inflammation, enlargement of the glands, and the presence of a sticky secretion. At first there are a scratching sensation such as occurs with sand in the eye, and the presence of tears in writing and reading, and later the eyes become red and sensitive. Inspection of the lids will show the granular formation. Trachoma should receive treatment at once since neglect of it may ultimately result in blindness. Inflammation or conjunctivitis is marked by redness of the eyeball, formation of sticky secretion and at times the presence of spots. The disease is easily carried by means of the hands and touch. Pupils affected should be excluded from the school and sent to the school nurse or doctor.

2. **Hearing.** Defective hearing can usually be de-

[19] From Burgerstein, L., and Netolitzky, A., *Handbuch der Schulhygiene*, 607.

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tected by the position of the afflicted pupil. If his hearing is weak he may lean forward and assume a strained expression. Disorderly pupils should also be tested since, at times, their disorder may be due to their inability to catch what is being said. Specific tests consist in moving a watch towards the pupil's ear. As it comes within 2 to 1 *m.* of the child's head he should be able to hear the ticking. Another test is to dictate a sentence slowly in a conversational tone and have the pupil write what is said without looking up from his paper. He should hear what is being said at the room's length. These methods are crude but they serve the purpose. If tests are made for purposes of research and accurate measurement some instrument should be purchased. Instruments vary and the directions usually given with them can be followed without further explanation.

§ VI. Posture

1. **Standing.** In a proper standing posture the shoulders are even, the chest and abdomen are on a line, and the feet are parallel. Protruding abdomen, hollow back, sunken chest, uneven shoulders, or head down is a position which should not be tolerated. At all times the pupil should stand with shoulders even, head up, and chest out. Proper standing should be emphasised in all oral work from the lowest grade to the highest. Before he is allowed to say a single word the pupil should be required to stand erect. After he has recited he should sit and not before. Pupils should not be allowed to recite in the act of standing nor close the recitation in the act of sitting.

2. **Sitting.** In a proper sitting posture the pupil should be well back in his seat, his feet should rest

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flat on the floor, his arms should hang in line with the hips, and his head should be up. Improper positions are (1) head forward and body curved, (2) head forward, body erect, but chest and shoulders contracted or raised (3) body supported by pelvis and shoulders, due to pupil slipping forward in the seat, (4) legs drawn under the seat or crossed, (5) body twisted sideways in any of a number of positions (6) head supported by elbows and in a forward position, and (7) sitting position on one leg, *i.e.*, leg drawn in under the body. In correcting such positions, the teacher should ask the children (1) to sit back in their seats, and (2) place their hands on their shoulders pulling the arms back, or (3) place their hands on the desks so as to throw the body back. When the pupils are in the proper position the hands should be put down. Physical exercise, two-minute drills are good for the same purpose. In the lower grades children might do some of the class work standing. Recesses, games, etc., may be used to allow of freedom and relief.[20]

3. **In writing.** To secure a proper position in writing the pupil should observe a few rules. These should be enforced by the teacher.

(*a*) *Paper.* The paper should be placed squarely before the child, and should be moved upwards as soon as the line is written. To facilitate this the teacher should see that the written lines are no longer than 1 dm.

(*b*) *Head and body.* The body should be erect with the head only slightly forward. The chest should not touch the desk but should be a few centimeters distant from it. The eyes should be as far from the paper

[20] From Burgerstein, L., and Netolitzky, A., *Handbuch der Schulhygiene*, 130–132.

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as the body will allow, and this distance should not be less than 3 dm. Proper seating should be afforded if the eyes are closer to the paper than this. There should be no turning of the body to the right or to the left. The body should be firmly supported on the pelvis.

(*c*) *Legs.* The feet should be placed flat on the floor. The legs should not be drawn in under the seat or twisted to one side.

(*d*) *Arms.* The elbows should be kept a hand's width from the body. The forearms should rest on the desk for about two thirds of their length. As the forearms rest on the desk they should form an angle of about 90° in front of the middle of the body.

(*e*) *Hand.* The hand should be supported on the two little fingers, which should be bent so as to throw the weight of the hand on the finger nails. The thumb should be extended and the index finger only slightly bent. The palm should be only slightly inclined.

(*f*) *Pen.* The top of the penholder should point towards the elbow and never towards the shoulder or chest. It should not be held too near the pen point.

(*g*) *Duration of lesson.* A writing lesson should be broken by stretching and similar drills. Writing should alternate with oral work and the general rules for the formation of the daily program should be followed in this connection.[21]

§ VII. Disease

1. **Infectious diseases.** The duty of the principal is to suggest precautions against disease, to recognise

[21] *Ibid.*, 609. The above directions are taken bodily from Burgerstein and Netolitzky's *Handbuch*, which is encyclopedic in character.

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dangerous symptoms, and to enforce Board of Health requirements. His efforts should lead to the physician's office or to the dispensary. In a discussion of infectious diseases for school purposes it is therefore necessary to consider predisposing conditions, the general appearance of affected children, and specific symptoms of the disease.

(*a*) *Cerebrospinal meningitis.*[22] Cerebrospinal meningitis consists of an inflammation of the piarachnoid both of the brain and of the cord. Conditions which seem to favor this disease are exposure, fatigue, carelessness of personal habits, and unhygienic surroundings. Outbreaks occur most frequently in soldiers' barracks and less often in workhouses and other institutions. The suddenness of the onset is a striking characteristic of the disease. Chills arise and headaches are felt. Pain in the head at the occiput is an early symptom. This pain is followed by stiffness at the back of the neck. The rigidity of the muscles of the neck may extend to the spine, limbs, and abdomen. The legs may become rigid and drawn up. In more serious cases delirium and coma follow. There may be a rise in temperature to 39° C (102° F). Accompanying these symptoms are usually cutaneous eruptions and affections of the eyes and ears.

(*b*) *Chickenpox* (*Varicella*). Varicella is a conta-

[22] For the different diseases, see: Ashby, Henry, and Wright, G. A., *The Diseases of Children;* Holt, L. Emmett, *The Diseases of Infancy and Childhood; A System of Medicine*, Edited by Thomas Clifford Allbutt, and Humphry Davy Rolleston, 1, 'Prolegomena and Fevers,' 2: Pt. I, 'Infective Diseases and Intoxicants,' 2: Pt. II, 'Tropical Diseases and Animal Parasites'; French, James Magoffin, *A Text-Book of the Practice of Medicine; A Text-Book of Medical Practice*, Edited by William Bain; and others.

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gious disease characterised by a cutaneous eruption of papules and vesicles. The incubation is 10–16 days. Infection occurs chiefly through contagion with affected children. Crowded conditions further the spread of the disease. At first the child is observed to be fretful for a few hours before the eruption. Sometimes there are slight rigors and a rise in temperature to 38°–39° C (100°–102° F). There may be nausea and perhaps vomiting. Within 24 hours eruptions appear on the back, chest, and abdomen. They consist of small, rose-colored macules which change to papules. Mild cases require no special treatment.

(*c*) *Coryza* (*Infectious cold, nasal catarrh*). Coryza or nasal catarrh is an inflammation of the mucous membrane of the nose which may extend downward. There may be a moderate fever and a temperature no higher than 38.5° C (101° F). Predisposing conditions are a lack of fresh air, dry overheated rooms, insufficient covering for the head, wet feet, exposure to cold and damp, and unnecessary coddling. A chill due to sudden exposure to cold may have different effects. There may result coryza, bronchitis, constipation, diarrhea, rheumatism, pains, or headache. Nasal catarrh usually shows itself by sneezing, watery discharges, and a cough. Nasal secretions clog up the breathing passages and there may be dull, frontal, heaviness.

(*d*) *Diphtheria.* Diphtheria consists in the formation of a fibrinous exudation at the pharynx, larynx, or nasal mucous membrane. There is an incubation period of 2–7 days. The disease is highly contagious. The germs may be carried by clothing, drinking cups, shoes, pencils, playthings, and the like. The bacilli

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enter the body chiefly through inhalation. An infected child shows drowsiness, peevishness, and fretfulness. The patient has a sore throat and may feel burning pain, especially in swallowing. There may be sneezing, nose-bleeding, and a tendency to vomit. The temperature rises to 39°–39.5° C (102°–103° F) and the pulse may be accelerated to 150 or 180 in the minute. As soon as a patient is believed to be suffering from diphtheria he should receive an injection of a full dose of antitoxin. All those believed to be infected should receive similar treatment. As antitoxin does no harm there should be no hesitation in having an injection given.

(*e*) *Erysipelas.* Erysipelas is a sharply-bordered spreading inflammation of the skin and adjacent mucous membranes. The incubation period is 3–7 days. The disease is common among the poor and weakly. Predisposing conditions are exposure to cold and damp, bad hygiene, fatigue, and exhaustion. Infection takes place by the inoculation of cuts and abrasions of the skin. When a child is infected he begins to feel ill and languid. There may be headache and even vomiting. The temperature rises to 40° C (104° F) or higher. Locally there arises a sharply defined patch of redness on the cheeks or at the junction of the mucous membrane of the nose and the skin, at the margins of the lips, or near the margin of the hairy scalp. The affected portion becomes red, hot, swollen, and shiny. It has a definite, irregular, raised border. It is accompanied by a feeling of burning pain. The patch spreads to the surrounding parts. If the disease spreads over loose tissues much serous effusion oozes into them. Thus the eyelids may become swollen, the

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eyes closed, the ears thickened, and the wrinkles filled out.

(*f*) *German measles* (*Rubella*). This disease is a mild infection characterised by a rash of red spots, slight inflammation of the lymphatic glands about the neck, and slight fever. The incubation period is 10–20 days. In the disease there is usually no initial stage. A discrete, pink, popular rash appears behind the ears and about the orifices of the nose and mouth. The eruption may extend to the trunk and limbs. There may be suffusion of the eyes, soreness of the throat, slight cough, headache, and pain in the back. The temperature may rise to 39° C (102° F). The difference between German measles, measles, and scarlet fever is shown in the following:

Rubella	Measles	Scarlet Fever
Incubation period is 14–21 days.	Incubation period is 8–12 days.	Incubation period is 2–5 days.
Usually there is no initial stage, the rash appearing first.	Definite coryza and fever about 3 days before the rash.	Usually finedite initial stage of about 24 hours. Nausea and vomiting, but no coryza.
Rash consists of small pink spots, discrete, and producing less definite patches.	Spots are redder and larger and coalesce to form definite patches.	Papules are punctiform brick-red, discrete, but merging into general erythema.
Tongue shows little fur.	Tongue well coated and occasionally patchy.	Tongue well coated with red points showing through creamy layer.

(*g*) *Influenza* (*Grip*). Influenza is an infectious disease characterised by a sudden onset and a short febrile period. The incubation period is 2–5 days. Infection takes place usually through inhalation. The symptoms of influenza are a violent aching of the head and eyeballs, pain in the back, racking in the bones, and a hard, dry, cough. There is nausea and sometimes vomiting. The face may assume a grey, dusky

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color. The tongue is usually coated with a white or creamy fur. The temperature rises rapidly to about 39.5° C (103° F) and sometimes higher.

(*h*) *Measles.* Measles is an infectious disease characterised by catarrh, the gradual invasion of fever, and the appearance of a rash on the fourth day. The incubation period is 7–14 days. About a week or so after infection the patient begins to suffer from catarrh of the mucous membranes of the eyes, nose, pharynx, and larynx. There is usually present a troublesome cough. The temperature rises to 39.5°–40° C (103°–104° F) and the pulse may go to 120 or 150. The face becomes pale, puffy, or dusky. A thin, watery fluid runs from the nose. The tongue becomes coated with a white fur and its edges are red. An unfailing indication of infection are Koplik's spots. These are bluish white specks on a red background, located on the membrane of the lips and on the inside of the cheeks opposite the molar teeth. Strong daylight is necessary for their observation. Within three or four days eruption appears in the form of rashes on the forehead, at the edge of the hairy scalp, or behind the ears. After a number of hours these rashes spread downwards to the trunk, arms, and lower limbs.

(*i*) *Mumps.* Mumps is an inflammatory infection marked by a swelling of the salivary glands due to an infiltration of the cellular tissue around them. The period of incubation is 14–25 days. The symptoms begin with fever often accompanied with headache and vomiting. The temperature rises to 39° C (102° F). If vinegar is brought into contact with the mucous membrane of the tongue a painful secretion of saliva occurs in the gland about to be affected. Stiffness in

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the jaws is complained of and an aching or tenderness is felt on one side in the hollow beneath the ear. This hollow soon fills out and the swelling extends backwards and forwards from this point till it covers the greater part of the face and neck. The skin over the swelling may become pale or pinkish.

(*j*) *Scarlet fever.* Scarlet fever is an acute infectious disease characterised by sudden onset, fever, rash, and free desquamation. The incubation period is 2–5 days. The first symptoms are chill, headache, sore throat, vomiting, and diarrhea. Within 24 hours a scarlet eruption appears on the neck and chest. The rash is of a brick-red or scarlet color. The cheeks become flushed. On the second or third day this vivid flush becomes tinged with white as if dusted over with a white powder. The region about the mouth stands out pale and white. The tongue becomes coated with a thick, creamy fur, and cleans rapidly. Peeling begins at the tip and edge, and within 24 hours may leave the tongue red and raw. No other form of sore throat is accompanied with such a raw-looking tongue. The temperature rises to 40° C (104° F) or higher and the pulse becomes 120 to 180.

(*k*) *Smallpox* (*Variola*). Smallpox is an acute infectious disease marked by a sudden onset, violent pains in the head and back, and an eruption which passes through the stages of macule, papule, vesicle, and pustule. The period of incubation is 9–14 days. The onset of the disease is sudden. In most cases there is frontal headache. Severe lumbar and sacral backache is felt, the pain extending to the thighs or legs. These aches last for some time after the eruption appears. There may be rigors, epigastric pains, nausea,

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retching, or vomiting. The tongue is often coated with a creamy fur. The skin is dry at first and afterwards sweaty. Constipation is present in all cases. The temperature rises as high as 40° C (104° F) and the pulse may reach 120 or 150. Along with these symptoms is the appearance of a rash on the trunk and limbs, and to a less extent, on the face and neck. Smallpox is different from chickenpox in the suddenness of the onset and rise in temperature.

(*l*) *Tuberculosis.* Tuberculosis is characterised by the formation of nodules which aggregate in larger masses. These then produce cavities, abscesses, ulcers, etc. Infection occurs chiefly through inhalation and feeding. Dried sputum carried about as dust is the most common means of transportation. Milk is also a common carrier of the bacillus. Contaminated foods may sometimes carry the infection. Predisposing conditions are the abuse of alcohol, worry, excessive work, insufficient exercise, close, damp atmosphere, inhalation of dust, fatigue, and lack of proper food. Children with long, flat, rounded, or narrow thorax should be looked after. The disease is best prevented by fresh air, plentiful feeding, and care of the digestive system. House and school cleaning should be so done as to raise as little dust as possible. Fresh milk should be used as food for children as much as possible as already suggested.

(*m*) *Typhoid.* Typhoid fever is an infectious disease affecting the lymph follicles of the intestine, the mesenteric gland, spleen, and similar organs. The incubation period is 10–21 days. Predisposing conditions are overcrowding, filth, lack of proper ventilation, destitution, defective nutrition, and improper

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sanitation. The infection is usually water-borne but it may also be transmitted by insects, soiled hands, clothing, and dust. At first there are chilliness or slight rigors, frontal headaches, languor, pain in the back and the limbs especially the thigh, giddiness and noises in the ear, loss of appetite, constipation, and sometimes nausea. There are also present coated tongue, high temperature, quick pulse, and flushed or dusky face. The eruptive stage follows on the fourth or fifth day. Then come restlessness, wakefulness, and delirium.

(*n*) *Whooping cough.* This disease is a severe form of catarrh of the air-passages, and is marked by laryngeal spasm and general nervous disturbance. The incubation period is 4–14 days. The symptoms are an ordinary cold in the chest, slight elevation in temperature, and frequent cough at night. There may be an initial stage of sneezing and discharge of thick mucus from the nose. A violent series of coughs burst out in short, sharp hacks and allow of no respiratory relief. The face becomes livid during such attacks. Severe spasms may follow one another rapidly leaving the child wet with perspiration and exhausted. Vomiting follows a fit of coughing.

(*o*) *General suggestions.* Certain precautionary measures should be enforced by the principal. In the first place, he should caution children against exposing themselves unduly to cold or fatigue. Damp clothing should be changed. In the second place, children who seem underfed and who appear to have a low resisting power to disease should be called outside and privately questioned. If their food is insufficient or not of the right kind their parents should be sent for or should

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be instructed on the care and feeding of children. In the third place, an effort should be made by the principal to spread information among the parents on the means of securing proper ventilation and cleanliness of the home. The proper removal of dust is here an important factor. In the fourth place, a principal should send a pupil home at once if he shows any symptoms of disease. Such symptoms in brief are, (1) vomiting or nausea, (2) watery discharges from the eyes or nose, (3) the appearance of rashes or cutaneous eruptions, (4) chill and trembling, (5) aches or pains in the back of the head, (6) general lassitude, (7) high temperature or rapid pulse, (8) coated tongue, (9) swelling behind the ears, and (10) puffed or dusky face. If one symptom arises in school it is much better for any further symptoms to show themselves in the child's home. The principal should not let the bogey of attendance percentage influence him in this connection. The principal or teacher should also be able to tell the child or his parents what diet should be followed in the case of fever or organic disturbance. Such light foods as milk, soft eggs, broths, beef-juices, light puddings, dry toast, etc., and drinks such as lemonade, fruit juices, barley water, linseed tea, egg-nog, etc., should be recommended. Finally the principal should know the period of quarantine for the more contagious diseases. In general the following periods should be insisted upon, (1) chickenpox, 21 days, (2) infectious coryza, 7–14 days, (3) diphtheria, 10–21 days, (4) German measles, 21 days, (5) measles, 21 days, (6) mumps, 21 days, (7) scarlet fever, 42 days, (8) typhoid, 90 days, and (9) whooping cough, 30–60 days. These periods may be longer or shorter according to the severity of

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the disease. A certificate from a physician or the Board of Health is often necessary before readmission of the patient can take place. It might be advisable for the principal to have a physician's thermometer. He should also have a list of the nearest dispensaries and hospitals.

2. **Intestinal disorders.** The usual intestinal troubles of children are diarrhea and constipation. Preventive measures are dietetic and hygienic.

(*a*) *Diarrhea.* Diarrhea is usually due to (1) insufficient abdominal covering, and (2) improper food. It may also arise from poverty, neglect, fatigue, exhaustion, and unhygienic surroundings. Chilling of the abdomen may bring on a violent attack. The child may be insufficiently clad. He may stand in a draft. He may remain in damp clothing. He may expose himself unduly to cold and wet. Improper feeding may also bring on an attack. Unripe or overripe fruits, decomposed meat, canned meat and vegetables (which contain organic or mineral poisons), painted candy, etc., are frequent causes. Treatment is partly dietetic. No food should be taken for a number of hours. Such drinks as cold whey, barley water, or albumin water should be given. Some warm cereal preparation, as rice, sago, or corn flour may be eaten. Oatmeal should not be allowed. After that the child can take meat broths, raw beef-juice, egg-white, eggs, and the pulp of underdone beef. All foods which leave a residue, as, green vegetables, and all irritants, as, whole-wheat bread, oatmeal, etc., should be avoided.

(*b*) *Constipation.* Constipation is due to (1) lack of exercise, sedentary occupation, etc., and (2) improper diet. An excess of starchy foods which leave no residue and a lack of green vegetables, meat, and fruit, usually

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induce constipation. Without the proper residual ballast and the necessary stimulation, intestinal peristalsis becomes retarded. Foods which leave a residue and which are more or less irritating should be given. Green vegetables, baked apples, stewed prunes, oranges, and in summer, fresh peaches, plums, and pears are effective in preventing or relieving constipation. Constipating foods, as, cheese, raw vegetables, nuts, starchy foods, etc., should be avoided.

3. **Functional nervous diseases.** Both principal and teacher should appreciate the common nervous affections which afflict children, especially as some of the nervous disorders are often mistaken for disorder.

(*a*) *Headache.* Among the different kinds of headache are (1) toxic headache, (2) headache from malnutrition or underfeeding, (3) headache arising from some disorder of the special senses, and (4) sick headache. Toxic headaches are caused by improper ventilation, excess of CO_2, indigestion, and constipation. Headaches arising from anemia or malnutrition are most frequent with girls from ten to fourteen years of age. Disorders of the senses which may cause headache are eye strain, adenoids or other growths, or ear trouble. Sick headache is usually accompanied by nausea and vomiting.

(*b*) *Hysteria.* Hysteria is more common with girls than with boys. It is brought about by worry, fright, fear, excitement, grief, shock, sudden injury, etc. At first there is a period of depression accompanied by great excitability and fits of passion. Emotional outbursts may take place and lack of control be shown. Fresh air, exercise, wholesome food, rest, and change are necessary. Tea and coffee should be forbidden.

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The child's condition should not receive further encouragement by any coddling or undue sympathy. Nagging, personal violence, or any form of punishment are entirely out of the question. No work should be expected or demanded till the child is in a normal state. A walk through the yard, a glass of water, etc., may aid in restoring the child's equilibrium.

(*c*) *Night terrors.* These are sudden attacks which come upon the child while he is sleeping. The child shows intense fear, and wakes up in a state of great excitement, often springing up with a scream of terror. Such attacks are usually due to overpressure at school, adenoids, general ill-health, digestive disorders, and lack of fresh air in the sleeping room. Suitable food should be given to the child. Malt preparations or cod liver oil may be prescribed. A systematic action of the bowels should be encouraged. The treatment suggested for constipation is effective in preventing attacks.

(*d*) *Nightmare.* Nightmare is the result of a bad dream. It is usually dissipated upon awakening. The attack is caused by mental worry and digestive disorders. Light meals should be taken in the evening and open-air exercise should be encouraged.

(*e*) *Chorea.* St. Vitus dance usually shows itself by fidgety motions, twitches in the fingers, an inability to hold articles, a stumbling gait, and spasmodic movements of the facial muscles. There is marked irritability and sometimes fretful and emotional outbursts. It is usually occasioned by fright and undue pressure. A child who is affected should be taken out of school and kept from excitement. Stimulants as tea or coffee should be removed from his diet. Simple and nutri-

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tious food should be given. Tonics, especially iron, are advisable. Rest is imperative.

(*f*) *Simple tic.* Simple tic is a spasmodic neurosis accompanied by jerky movements. It is usually started by some local cause. Thus, nasal catarrh or adenoids may lead to sniffing, conjunctivitis may lead to blinking, and so on. Often some trick is imitated and formed into a habit. Common movements are sniffing, blinking, drawing the mouth to one side, tossing the head, and the like. Treatment should be begun before the movements become fixed in habit. Gymnastic exercises are helpful. The child should be encouraged to acquire greater facial control. Actual or threatened punishment is extremely harmful.

(*g*) *Convulsive tic.* In convulsive tic there are, in addition to spasmodic movements, explosive utterances with obsessed and imperative ideas. There occur facial contortions, grimaces, gestures of defiance and contempt, and movements of defence. There is a tendency to repeat words or gestures. The muscles of the face and neck are especially affected. Convulsive tic is caused by shock and undue pressure. The description of tic fits closely many cases which are usually classed by the teacher as sulks, defiance, insubordination, and the like. There can be no doubt that nagging, personal violence, overpressure, etc., in the classroom are exciting causes. Especially when children are irritable, underfed, or feverish, will convulsive tic be stimulated in this manner. Rest and quiet are imperative in such cases. No work for the time should be enforced or even demanded. A simple gymnastic drill and plenty of fresh air will be helpful. The general resisting power of the child should be

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developed by liberal feeding. The parents should be advised if necessary.

4. **Nasal obstructions.** The most common obstruction to a child's breathing is the adenoid growth in the pharynx. This is a mass of lymphoid tissue which is found at the vault of the pharynx. As adenoids interfere with the child's breathing and therefore with his growth and general health, their removal should be insisted upon. A child afflicted with these growths usually becomes a mouth breather. He lets his lower jaw hang and leaves his mouth open. In addition, his face becomes pale, his expression vacuous, and his nose more or less pinched in appearance. He may articulate in a slovenly manner. Nervous depression, anemia, or headache may be present. Parents should be advised of the consequences of adenoids, and should be urged to secure proper treatment. It should be explained that the large amount of bloody matter discharged after an operation is chiefly mucus. The operation is practically harmless. After treatment, the child should be kept quiet for 24 hours, and should remain in the house for several days.

5. **Parasites.** In children who come from unclean homes pediculosis of the head may be found. In such cases the pediculus or louse infests the head, the female laying about eighty eggs a week. These glistening nits can be seen attached to the hair. The male animal is 1–1.5 mm. long, the female 3 mm. long and of a grey color. To remove this parasite the hair should be soaked with kerosene, scrubbed with soap, washed with vinegar, and then rinsed with water. The former washing kills the pediculus, the latter destroys the eggs. Pediculosis of the body is a common complaint

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of tramps. It is cured by cleansing the body and disinfecting the clothing. Itching is relieved by the application after bathing of carbolated vaseline, or of sodium bicarbonate and carbolic acid (2 per cent).[23]

[23] On 'medical inspection of schools,' see, Gulick, Luther Halsey, and Ayres, Leonard P., *Medical Inspection of Schools.*

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PART II

THE PUBLIC AND THE SCHOOL

CHAPTER V

THE SCHOOL BUILDING

§ I. The Classroom

1. **Size and shape.** The size of a class is not determined by the number of children which can be crowded into a room, but by definite conditions. When such conditions have been satisfied the number of pupils which the space can accommodate, and the ventilation necessary, are to be considered. The length of the room depends upon (1) the normal limits of vision, (2) the hearing power of children, and (3) the carrying power of the teacher's voice. The distance at which ordinary writing on the blackboard can be seen without strain is about 9 m. Tones of conversational loudness can also be heard at this distance. A longer distance requires more deliberate intonation and an oratorical manner of speaking which are extremely fatiguing.

The width of the room is limited by the strength of the illumination which reaches the parts farthest from the source of light. In ordinary daylight the illumination at 2 m. distance is only .80 of that at 1 m. distance

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from the windows; at 3 m. distance it is from .40 to .50, and so on in a rapidly decreasing series of intensities. A width of 6 m. will allow of proper illumination of the desks farthest away from the source of light.

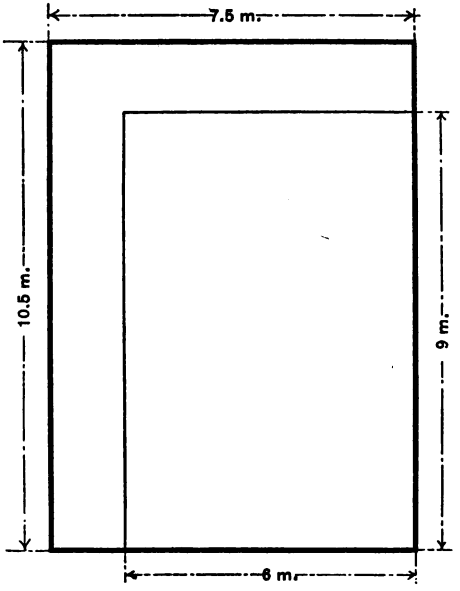

FIG. 11. — Size of a standard classroom.

The height of the room is conditioned by (1) the cost of construction, (2) the length of the stairways, and (3) the effect of the height on the teacher's voice. If the rooms are made too high the cost of the building will be increased, the children will have to climb too many stairs, and the voice of the teacher will not carry so well. If the rooms are too low not enough light will be admitted to reach across the room. A proper height is from 4 m. to 4.5 m.

The space which is occupied by the seats and not inclusive of any outside aisles between the walls and the seats should therefore be 6 m. × 9 m. If we allow 1.5 m. for outside aisles the size of the room up to the walls or closets should be 7.5 m. × 10.5 m. Side and rear aisles and spaces without seats are necessary for demonstration tables, exhibition stands, marching of

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the children, etc. The size of the room as a whole should be 7.5 m. × 10.5 m. × 4.5 m.[1]

The ordinary classroom should run the long way from the blackboard to the rear. This is necessary when the light comes from one side. Even if light comes from the top of the room or from both sides the desk and the blackboard should be on the short side of the room. This will prevent unnecessary foreshortening of objects and widening of the angle of vision.[2]

2. **Illumination.** Good light in the classroom is necessary (1) to ensure normal functioning of the eyes, (2) to prevent improper postures in reading and writing, and (3) to prevent the growth and development of germs. Conditions which further good vision are the size of the writing on the blackboard, of the objects to be used, etc., and the contrast between the objects and the background used. Black objects should have a white background, and the like.

(*a*) *Standard illumination.* For reading and writing purposes the minimum illumination should be that present on a fairly clear day in winter at 3.30 P.M. A more definite standard can be obtained by measuring the light present at that time. Under the most favorable conditions sunlight reaches from 1500 to 6000 candlemeters and becomes as low as 500 candlemeters. On cloudy days it may fall as low as 150 candlemeters.[3] If we consider that with artificial light at night proper

[1] See Burgerstein, Leo, and Netolitzky, Aug., *Handbuch der Schulhygiene*, Ch. II, § 1.

[2] See Shaw, Edward R., *School Hygiene*, Ch. I.

[3] Burgerstein, L., and Netolitzky, A., *Handbuch.*, 209. See Rowe, S. H., *The Lighting of Schoolrooms.*

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illumination requires a light of from 30 to 50 candlepower at a distance of 3 dm., we may give as a minimum from 250 to 500 candlemeters. This corresponds to the minimum light given by the sun on the less favorable days and during school hours. A candlemeter is the light given by one candlepower at a meter's distance. With artificial illumination this standard can be maintained by bringing light of less intensity closer to the surface under observation. As the intensity varies inversely as the square of the distance the intensity necessary can readily be calculated.

By means of various tests it has been estimated that the minimum requirements for illumination are from 10 to 50 candlemeters.[4] The experiments by which these standards were determined, however, set limits at which strain was felt or at which letters of a certain size could just be read. Now it is evident that even if one is able to see letters and read them without discomfort or strain one may still have insufficient light. One requires sufficient light for continuous work such as is necessary in reading printed matter or in sewing. One may, for example, read by candle light for a short period. One may read by twilight without much strain. The normal conditions, however, should be the ones taken as standard. Such conditions will be found at 3. or 3.30 P.M. in the winter time. Nothing less should be accepted.

(*b*) *Measurement of illumination.* A few simple methods of determining the intensity of light should be known. Rumford's photometer is an apparatus by which the shadows of a single stick are thrown upon a background and compared. When the two shadows are of the same

[4] Burgerstein, L., and Netolitzky, A., *Handbuch.*, 205–208.

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intensity, the intensity of the one light is measured in terms of the other. The law used in such a case is, *The intensity of illumination is inversely as the square of the distance from the illuminating body.* Thus, if two lights cast the same shadow, or give the same amount of light, the one which is twice the distance from the screen will be four times as intense as the other. In Ritchie's photometer the two lights to be compared are thrown, one from each side, on the edges of a white cube with the edges turned towards the observer. When both sides have the same illumination the distances can be compared, and the one light measured in terms of the other. Bunsen's photometer has as its basis a paper membrane on which is a spot of stearine (*i.e.*, a grease spot). When more light appears from behind, the spot is seen as a bright spot against a dark background. When more light comes from the front the spot appears as a dark spot against a light background. When both illuminations are of equal intensity the spot can not be distinguished from the general background. The ratio of the distances can then be found. More expensive photometers are based upon similar principles.

(*c*) *Window space.* Various estimates have been made of the amount of window space necessary for proper illumination. Some make the minimum space from $\frac{1}{6}$ to $\frac{1}{4}$ of the floor space, one suggests 2670 sq. cm., and another the square root of the volume of the room. There should be little calculation in this connection.[5] If daylight is the normal light, then as much daylight as is possible should be admitted into the room, the more the better. All the space, then, which is not

[5] Burgerstein, L., and Netolitzky, A., *Handbuch.*, 209.

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absolutely needed for purposes of support should be filled with windows. If, as in steel constructions, brick, etc., is used only for purposes of filling in, all the space between the steel supports and facing daylight should be filled with windows or with glass. The plan of buttressing the walls as in churches and cathedrals might be followed where steel construction is impossible.

Windows should be built as close to the ceiling as possible with no unnecessary obstructions to light in the way of crossbars, etc. If there are transoms, these should be filled with clear glass and not with ground glass, painted glass, and the like. Any obstructions to light in the shape of curved or other formations at the tops of the windows should be avoided. Since the greatest amount of light comes from the top it is evident how necessary it is to have a free passage to light at the top of the windows. The bottom of the window should be as close to the floor as is consistent with the safety of the children. The sills may safely be placed as low as from 1 m. to 1.25 m. from the floor.

(*d*) *Window glass.* Because of obstruction to light by trees, high buildings, etc., the light of the sun may be shut out in part from the classroom. The highest rooms will receive the most light and the lowest rooms the least. To ensure proper distribution of light in such cases the window panes should consist either of factory-ribbed glass (*i.e.*, a glass which is plain on one side and which has 21 ribs to 25 mm. in true curves on the other) or of prismatic glass (Luxfer prism). The ribs should run horizontally so as to catch the sunlight and diffuse it throughout the room. If a vertical space made by buildings close to one another lets in light, the ribs might run vertically. Such glass diffuses

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the light throughout the room and also shuts out unsightly views. Luxfer prisms may be employed for a similar purpose. These are more expensive than factory-ribbed glass but they are much more effective. The Luxfer prism is a small thick pane of glass, 10 cm. square, with raised prisms on one side. These prisms are glazed into a large window. The angle at which the prism should catch the light can be so determined that the rays will be thrown across the room, or against the ceiling where they will be reflected downwards. Prisms should be placed at the top of the window or in frames outside of the window. In rear rooms they are especially necessary. Since Luxfer prisms and factory-ribbed glass are heavier than ordinary glass heavier window weights must be employed with them.

(*e*) *Direction of light.* The strongest light should come from the left. This is necessary to throw shadows from pen or pencil to the right and out of the way of the work. Desks should therefore be so arranged that when the children are sitting at their work the most intense light will come from the left. As the teacher faces the class the best light will then come from his right. If light comes from the right side of the children and from the top of the room it should be weaker than the light coming from the left. Light from the rear should be avoided if possible as its glare tends to distract and fatigue the teacher. If it is necessary, light from the rear should pass through a shade of light grey-green color.

(*f*) *Shades.* When the direct rays of the sun enter the room, shades should be provided for the windows. Any complicated shade machinery is to be avoided. Since direct sunlight may be objectionable at different

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parts of the room a shade should be so constructed that it will shut out the direct rays at any part of the window. A common spring shade which can be raised or lowered as a whole in tracks at the side of the window will fill all requirements. When the shade has been placed at the required height it can be pulled down to the length necessary. Spring shades if not on tracks may be placed at the bottom of the window, in the center, or at the top. Each of these positions, if fixed, is objectionable. Only those direct rays should be shut out which fall on the children's desks or faces. As the light of the sun moves, the shade should be moved up or down to meet the changing conditions. If the shade is fixed, such a movement is impossible. Of Venetian blinds the only thing which can be said is that they are a general nuisance. They are expensive, they collect dirt, they produce bands of light, and they get out of order when they are most needed.

(*g*) *Window piers.* To have the space through which the light enters as wide as possible the window piers should be beveled. The wall at the top of the window should also be beveled. Much space can be gained in this way.

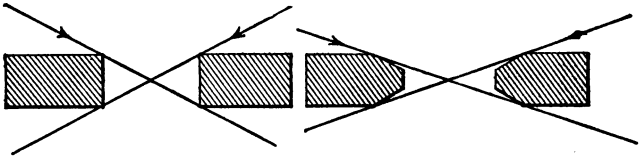

FIG. 12. — Beveled window pier. (Burgerstein, L., and Netolitzky, A., *Handbuch*, 218.)

(*h*) *Artificial illumination.* If artificial illumination is necessary as in night school, the aim should be to

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approximate conditions in daylight as closely as possible. A model arrangement would be to have (1) a light of 30 candlepower placed on the left-hand side of each desk at a height of from 3 to 4 dm. from the desk, (2) a few lights of 20 candlepower each placed at a distance of from 2.5 to 3 m. from the floor, and (3) several lights of about 30 candlepower placed directly above and a little to the front of the blackboard. The usual illumination of the classroom in night school is wholly inadequate for the fine adjustments necessary in writing and reading. An objection to the desk light is that it would be in the way of the day-school children. Fixtures which can be removed would do away with this objection. If, however, elevated illumination is used, some attention should be paid to the principles of illumination. Light should come from the left, if possible. The source of artificial light should therefore be somewhat to the left of the desks. By means of reflectors placed at an angle the light might be sent in an oblique direction so as to come from the left. If the light is from 1 to 1.5 m. from the desk the row of lights over each row of seats should be from 100 to 500 candlepower. The usual distribution of lights in a symmetric manner may be artistic but it is not as effective as it might be. Artificial light should be steady and its rays should not shine directly into the pupils' eyes. A translucent globe of light-green color should be placed under the light to diffuse the glare of the direct rays. Reflectors should be as bright outside as inside so that during the day they will aid in diffusing the light. The bare electric bulbs or the incandescent lights should not be tolerated since they are extremely injurious to the eyes. A grey-green

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globe should be placed under them to prevent unnecessary glare. Ground glass may also be used for the same purpose.

The rays which form white light vary in amount according to the source of artificial illumination. The blue and the violet rays are harmful to the eyes and are most intense in electric illumination. In illumination by means of gas or kerosene the blue and the violet rays are not so prominent. The figure which follows shows the rays in light from different sources.

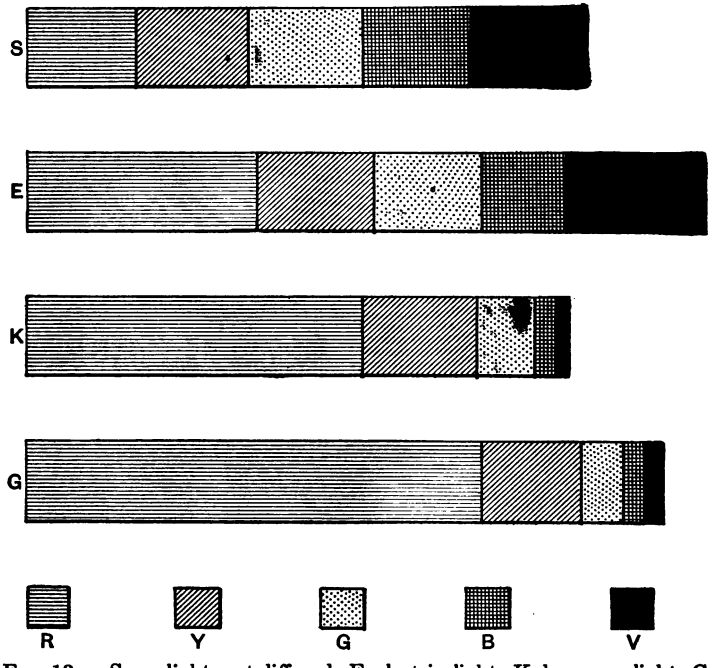

FIG. 13. — S, sunlight, not diffused, E, electric light, K, kerosene light, G, gas light. R, red or heat rays, Y, yellow or most intense light rays, G, green rays which help to tone down the yellow rays, B, blue, and V, violet, chemical rays harmful to the eyes.

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3. **Ventilation.** Before dealing with ventilation proper, it is necessary to consider (1) the composition of the atmosphere before and after respiration, (2) the requirements of respiration, and (3) the effects of improper ventilation upon the individual.

(*a*) *Composition of the atmosphere.* Under normal conditions the composition of air in volume per cent is, nitrogen, 79; oxygen, 20.96; and carbon dioxid, 0.04. The new elements, argon, neon, helium, etc., are included with nitrogen. In volume per cent argon is 0.937 and neon, helium, krypton, and xenon are in still smaller quantities. There are also found other substances. Carbon dioxid has already been mentioned. This exists in smaller amounts in sea air, in greater amounts in winds which have passed over a large extent of land, in larger amounts on dull, cloudy days than in bright, fine weather, and in greatly increased amounts in large towns where much coal is used.[6] Water vapor is found in varying quantities. If saturation is considered as 100 per cent, the humidity may vary from 10 or 20 per cent close to 100 per cent. If the weight of water which can be absorbed by 1 cu. m. of air is considered, the maximum amount of aqueous vapor may vary from 4.871 grams to 50.7 grams, according as the temperature varies from 0° C to 40° C. If the aqueous vapor is measured by pressure it may vary from 4.5 mm. to 50 mm. height of quicksilver according as the temperature varies from 0° C to 40° C.[7] These are all maximum or saturation measurements. A trace of

[6] See: Howell, W. H., *A Text-Book of Physiology*, Ch. XXXVI: Roscoe, H. E., and Schorlemmer, C., *A Treatise on Chemistry*, I; §§ 329–345.

[7] Burgerstein, L., and Netolitzky, A., *Handbuch.*, 263, 266.

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ammonia due to the decomposition of nitrogenous organic matter is present. In combination with ammonia are found small quantities of nitrous and nitric acids. Carbon monoxid is found where there is an improper combustion of carbon. Sulphuretted hydrogen exists in the air of sewers, excavations, marshes, etc. Finally, suspended matter of all kinds, partly organic, partly inorganic, may be seen floating in the air.[8]

Inspired air contains in volume per cent, N, 79; O, 20.96; CO_2, 0.04; and expired air contains in volume per cent, N, 79; O, 16.02; and CO_2, 4.38. It is seen that 4.94 parts of oxygen are retained, while 4.34 parts of CO_2 are given out. The increased amount of oxygen retained is due to the oxidisation both of carbon and hydrogen of the body. Some of it is sent out in CO_2, and some of it is excreted as water. Certain physical changes also take place. The air breathed out is warmed quite to the body temperature and is saturated with vapor. This heating of the expired air is a factor which must be considered in the problem of ventilation.

(*b*) *Requirements of respiration.* The vital capacity of an adult man is about 3400 cu. cm. In quiet respiration about 500 c.c. of air are breathed in. If we reckon the respiration-rate at about 15, we may determine the amount of air respired as follows:

Per minute, 500 c.c. × 15 = 7500 c.c. or 7.5 liters.
Per hour, 7.5 l. × 60 = 450 l.

The amount of oxygen required *per* hour is therefore 4.94 per cent of 450 liters or 22.23 l., while the volume

[8] See: Fletcher, Banister F., and Fletcher, H. Phillips, *Architectural Hygiene,* Ch. XIII, § 3; Tyndall, John, *Essays on the Floating Matter of the Air.*

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of carbon dioxid expired is 4.38 per cent of 450 l., or 19.53 l. Sufficient fresh air should be supplied to keep the CO_2 down to at most .06 per cent. The normal amount of CO_2 in the atmosphere is .04 per cent. It is seen that .02 per cent can be added to the normal amount before vitiation takes place. Since about 20 l. of CO_2 are expired *per* hour, the amount of air which is necessary for an individual *per* hour is 20 l. ÷ .0002 or 100000 l. or 100 cu. m. If an individual has less cubic space than 100 cu. m., the air must be renewed in periods of less than an hour.

Lower standards than this are often given. Thus, if .07 per cent of CO_2 is taken as the amount permissible, .03 per cent may be added to the normal amount. This will bring down the amount of fresh air required *per* hour to 66.66 cu. m. If 1 per cent of CO_2 is taken as the minimum limit of vitiation, .06 of CO_2 may be added to the normal amount. This will give 33.33 cu. m. as the amount of air necessary *per* hour. Again, children inspire less air than the adult. This will further reduce the standard necessary for ventilation. But the following facts must also be considered. The air in cities is none too pure. In addition, dust and organic particles are often abundant in the classroom. Again, children do not always respire in a quiet manner. Manual work, motor activity of all kinds, proper articulation and enunciation, singing, etc., will necessitate deeper respiration and a greater volume of air. Finally, rooms are often crowded with more than the normal number of children as in meetings, doubling up of classes, etc., and are sometimes used for night school classes. It seems advisable, therefore, to adhere to 100 cu. m. *per* hour as the standard to be aimed at for

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each pupil. Such a standard, moreover, will approximate more or less closely conditions as they exist outside of the school.

(*c*) *Effects of improper ventilation.* Improper ventilation results both in positive injury and in a feeling of discomfort. The increase of carbon dioxid and organic matter and the decrease of oxygen are in themselves detrimental. In addition, the accumulation of water vapor and the increase of temperature due to the expired air prevent the radiation and release of heat from the body. Such a condition may result in the production of a fever temperature.

The statics of ventilation deals with (1) the outlets, (2) the inlets, and (3) the flues. The dynamics of ventilation is concerned with (1) the quantity of air to be provided, (2) the quality of air, and (3) the means of effecting change of air.

(*d*) *Outlets.* In considering the proper position for the outlets one must pay due regard to (1) the fact that the vitiated air which is expired is highly warmed, and (2) the law of the diffusion of gases. Under the same conditions, *i.e.*, at the same level of temperature, CO_2 is 1.529 times heavier than air. When heated, however, CO_2 becomes lighter and therefore rises. The close and heated atmosphere felt near the ceiling of a room shows this. A few common experiments point to the same fact. If a series of candles, one higher than the other, are burned in a closed jar, the top ones will go out first showing that the CO_2 has risen. When the CO_2 has risen it does not collect and remain at the top in a close mass but diffuses with the air. If, for example, two communicating vessels, the upper one filled with hydrogen, the under one with carbon dioxid,

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be placed one over the other, the two gases will mix and distribute themselves uniformly throughout the two vessels. It is by the diffusion of gases that the mixture of gases of the atmosphere is effected.[9] Morrison found in a number of tests 'that CO_2 was in every case found in the largest quantities at the top of the room.' [10]

The outlets should therefore be placed near the ceiling. This position conflicts with most of the practice and much of the theory of ventilation. Much of the experimentation in this connection has been done in empty rooms and has disregarded the fact that the heated bodies of the children aid in the distribution of CO_2 at the top of the room. If outlets are at the bottom and inlets at the top the rising currents of CO_2 must meet with the incoming fresh air and vitiate it to some degree.[11]

(*e*) *Inlets.* For the same reason inlets for fresh air should be low, at least on a line with the children's waists in sitting position. If incoming air is warmed it will still be of a temperature lower than that of the expired air. It will also promote the distribution of impure air at the top of the room. If the inlets are near the ceiling the fresh air will conflict with the impure air and perhaps carry it back to the children. By diffusion some of the impure air will mix with the fresh stream coming down. In natural ventilation by means

[9] See, Roscoe, H. E., and Schorlemmer, C., *Treat. on Chem.*, 1: §§ 44–50; Lommel, Eugene, *Experimental Physics*, Eng. tr. by G. W. Myers, § 96.

[10] Morrison, Gilbert, B., *The Ventilation and Warming of School Buildings*, 38.

[11] See Woodbridge, S. H., *Upward versus Downward Ventilation. Extracts from a Report on the Ventilation of the Capitol, Washington, U.S.A.*

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of windows the principles above mentioned are usually recognised. Windows are opened at the top to let out the air and at the bottom to let it in. On windy days some outlet should be provided on the side away from the windows. Even where ventilation plants are used the windows should be thrown open several times during the day and also in spring and summer weather.

(*f*) *Flues.* Flues should lead directly to and from the classroom without connection with any sources of impurity. All bends in the flue should be curved and graduated. When bends are not curved the flow of air through them is greatly retarded.

(*g*) *The quantity of air.* The amount of air which should be sent into the classroom depends upon (1) the quantity of air needed for each pupil, (2) the number of pupils, and (3) the size of the room. If we reckon on a basis of 50 pupils to a room 10.5 m. × 7.5 m. × 4.5 m. in size, it is seen that the air in the room must be renewed at least once every 4 minutes. This period of renewal is somewhat shorter than the usual periods which are given. It is necessary, however, because of the greater quantity of air *per* pupil allowed, 100 cu. m. *per* pupil each hour. The size of the inlets for fresh air is conditioned by the rate of flow. If the air enters the room at the rate of 2 m. *per* second for a class of fifty children into a room of standard size the total area of the inlets should be at least 70 sq. dm., and if possible, 1 sq. m. To facilitate the distribution of air the inlets should be placed on the three sides of the room away from the windows and from exposure. So that no draft be felt the inlets should consist of a number of conical openings, the smaller opening pointing

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towards the aisles.[12] Inlets should face the aisles or the open spaces between the seats so that the freest passage of air is possible. The outlets should be of the same total area as the inlets. They should be placed in or near the ceiling and should be covered with screens having large meshes.

It might seem that under such conditions the center of the room will not receive a sufficient supply of fresh air. But it is evident that since the vitiated currents are constantly rising from the pupils the resulting suction will aid the movement of the incoming air. The source of fresh air being below the line of breathing, only fresh air can be drawn upon to fill the space. Moreover, when the incoming air has been partially diffused it will by its own weight fill the lower and the central portions of the room.

(*h*) *The quality of air.* Before air is sent into the room it should be taken from a pure source, filtered, and saturated with a proper amount of moisture. The distance from the ground at which the air should be taken will depend upon the general condition of the atmosphere outside. If the streets are narrow, if a sewer or other similar situation is near at hand, the air should be drawn from a place as high as possible. If conditions are favorable the air may be drawn through an opening 3 m. from the ground. Wherever the opening is placed it should be easy of access so that it may be readily inspected.

The dust in the air should be kept out by means of a filter. Air which has been properly filtered will be

[12] See Woodbridge, S. H., *Upward versus Downward Ventilation. Extracts from a Report on the Ventilation of the Capitol, Washington, U.S.A.*

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'optically pure,' to use Tyndall's expression. When seen in the direct rays of the sun such air will show no motes nor dust particles. Air may be filtered by being passed through a screen covered with cheese-cloth or with jute-cloth or by being drawn through hempen cords over which water is trickling. If screens are used they should be replaced by fresh ones as soon as they become covered with dust.[13]

If the temperature of the room is to remain at 20° C the proper humidity, about .50 saturation, will require a little more than 8.5 grams of water *per* cubic meter. This will give a pressure of about 8.7 mm. in height of the mercurial barometer. These figures may vary depending upon conditions outside of the school. A model arrangement is that in which conditions in the school are kept the same as those outside. If the air in the room is too dry the nasal passages, throat, and lungs suffer. The following tables indicate the relation between temperature and saturation *per* cubic meter, and temperature and pressure:

Saturation per Cubic Meter				Pressure at Saturation			
c.	Grams.	c.	Grams.	c.	m.m.	c.	m.m.
0°	4.871	20°	17.157	0°	4.5	20°	17.4
5°	6.795	25°	22.843	5°	6.5	25°	23.6
10°	9.362	30°	30.095	10°	9.2	30°	31.6
15°	12.746	35°	39.252	15°	12.7	35°	41.3

(*i*) *Change of air.* Change of air is best effected by the plenum or pressure system combined with a mod-

[13] See Shaw, E. R., *School Hygiene*, 85.

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erate exhaust system. In the plenum system the fresh air is forced through the flues by means of a fan. The fan may be a disk fan (air propeller) or a centrifugal fan (paddle-wheel fan). The passage of the impure air through the outlets may be facilitated by the use of an exhaust fan. This is placed at the top of the outlet flue. Since the fresh air which is introduced must be heated on cold days the system of ventilation is usually combined with some system of heating.

4. **Heating.** The simplest method of heating is to place some surface which radiates heat in the room to be heated. Coils through which the heat passes are most convenient. All such heating surfaces should be placed close to the windows or exposed surfaces, and on the floor. Coils near the ceiling are practically worthless since the warm air rises. When the source of heat is in the room we have what is called direct heating. Before the fresh air is sent through the inlets into the room it should be warmed by being passed over heated coils. A combination of direct heating with this form of ventilation is desirable. With heated coils in the room the fresh air which is sent into the room should be about 20° C. When it reaches the room the coils in the room will keep such air at an even temperature. The room temperature should be about 20° C or 68° F. It may even be a few degrees lower. In England and Scotland the standard is a little over 18° C or 65° F. If a sufficient amount of fresh air is supplied the children can easily endure a lower temperature with comfort. The air sent into the rooms should contain sufficient moisture. Large porous vessels containing water should be placed on the steam radiators to sustain the humidity of the air. In fact

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stout vessels should be fixed to the radiators for this purpose.

5. **Cleaning.** The danger from dust and improper ventilation in the school can not be overemphasised. In a most convincing report [14] the Brooklyn Teachers' Association has shown that in the case of measles, scarlet fever, diphtheria, and croup, there is 'an abrupt rise in the number of cases in the fall after school opens and after the windows are closed, while just as abrupt a drop occurs in the spring when the windows are opened, and the drop continues to a minimum in September, the maximum occurring six months later in March. A glance at the chart discloses the fact that a measles epidemic occurs in New York every second year, the even numbered years; and it would seem that scarlet fever is epidemic every third year.' These facts were obtained from the reports of the Board of Health.

The dust which is allowed to accumulate is dangerous because of the germs which it carries. The putrid matter of the street which is carried into the school on the shoes of the children, the dust which is sent into the air from numerous households, in fact, any dried and comminuted matter is the vehicle by which bacteria are distributed. The air itself is comparatively free from germs.

These are not found isolated in the air, but aggregated in small groups and adhering to particles of dust. Dust is the vehicle by which they are transmitted to the air, and the bacteria therefore belong to the more ponderable elements of the air-dust. Thus, for instance, if the dust in a room be stirred up, large numbers of bacteria will be found in the air; but after the dust has once again

[14] *Brooklyn Teachers' Association, Report of the President*, 1906–1907, 40.

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settled to the ground, the bacteria disappear in great part, leaving the lighter free spores of the moulds in the air. . . . It thus appears that the most dangerous factor, hygienically, is not the air itself nor the gases and sewage emanations that may be present in it, but the dust to which bacteria cling.[15]

The most important part of cleaning, therefore, is the removal of dust from the classrooms, halls, stairs, etc. To prevent the entrance of dirt and dust the air should be filtered in the manner suggested. The use of scrapers and mats should be rigidly insisted upon since any dirt which enters on the shoes of the children is ground fine and redistributed as dust. To remove the dust from desk tops, closets, moldings, etc., a damp rag should be used. The children may at times be impressed into the service. A practical lesson in housecleaning can hardly be objected to. In Worcester, Mass., the pupils of a school were given instructions in dusting.

Appointed monitors come fifteen minutes early each morning, take their cloths to the sink, moisten them, wipe the desks and furniture of their school room, rinse their cloths, and hang them up to dry. Once a week the cloths are laundered. As a result there was not a case of contagion in a school of 425 pupils during the entire school year, the first year in the history of the school of which this is true.[16]

Dust on closet tops should be removed in a similar manner. The insides of closets are usually cleaned at times, but the dust at the top is seldom touched.

The rooms, halls, yards, etc., of the school should be swept every day. To prevent the redistribution of

[15] Roscoe, H. E., and Schorlemmer, C., *Treat. on Chem.*, 1: 598–599.

[16] *Brooklyn Teachers' Association, Report of the President*, 1906–1907, 37.

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dust some wet substance, as sawdust, should be strewn upon the floors. There should be fixed hours during which the school is to be cleaned and during which inspection is possible. Once every week the rooms, yards, stairs, halls, etc., should be mopped, once each month they should be scrubbed and once each term disinfected. If the halls are of concrete or other water-proof material they should be cleaned by a free flow of water. The entire building should be renovated when necessary.

School books and material which are carried to and from school should be disinfected at least once a term, and at any time in which a disease is epidemic in the neighborhood. The supply closets, storerooms, etc., should be similarly disinfected. The best disinfectant is formaldehyde. Tablets of the polymerised substance (2 grams *per* cu. m.) should be vaporised, and closets and storerooms may also be sprayed with formalin reduced in strength to 2 per cent formaldehyde. When a room is disinfected the doors and windows should remain closed from 12 to 24 hours. In the matter of pens, pencils, rulers, etc., disinfection should take place from time to time. Pencils, rulers, etc., should be collected every day so that the accumulation of dirt and germs may be lessened. It is difficult, in fact, almost impossible, to prevent contact through passing of articles in the school from hand to hand. Contagion can at most be only lessened. The importance of good food, fresh air, and wholesome exercise should be emphasized. A weakly child may be disinfected every day and still fall victim to disease if he has not sufficient resisting power.

Cleaning should first of all be considered a hygienic

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rather than an artistic matter. The following recommendations should be carefully considered as they sum up many of the points just made:

(1) Destroy all feather dusters in the schools and prohibit their further use.

(2) No part of the school-basement, halls, school rooms, should be swept while dry. A copious application of wet sawdust (or other wet material) should be made before sweeping. . . .

(3) Dust will get into the school room, however, through windows, ventilating flues, etc., and it will settle on the desks, walls, and floors. The sweeping described will remove the dust from the floor with the other dirt. The dust should be removed from the desks by the use of dampened cloths and not by the use of the feather duster. This can be done as a lesson in domestic science, and as every boy and girl would be benefited no one would hesitate to help, and parents should be only to glad to allow the children to assist in bringing about a sanitary condition of the school which will mean so much in the saving of the lives of their little ones. . . .

(4) The side walls should be carefully and frequently brushed down.

(5) The interior of the ventilating apparatus, in filthy condition in most schools, should be kept scrupulously clean.

(6) Each school house . . . should be completely provided with a vacuum cleaning outfit, with proper connections in every room in the building.

(7) Steps should be taken of a preventive character . . . and thus further assist in the reduction to a minimum of the slaughter of the innocents.[17]

6. **Furnishings.** Under classroom furnishings may be included all fittings of the room save the desks and seats. All such fittings should be placed in the room with a view to (1) health, (2) comfort, and (3) artistic satisfaction.

(*a*) *Molding.* All moldings, ornaments, etc., should

[17] *Brooklyn Teachers' Association, Report of the President,* 1906–1907, 46.

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consist of graceful, unbroken curves, or artistic combinations of plane surfaces. Fantastic twists and curves in rococo style should be avoided because of the dust which usually collects in them. The pseudo-Corinthian columns should give way to the Doric, the moldings should consist of unbroken curves which are beautiful and which can easily be cleaned, and the various grooves and openings in the wood and iron fixtures should be replaced by smooth and rounded surfaces. The junction between the wall and the floor should be curved so that the dirt can readily be removed.

(*b*) *Floor.* The floor of the room should consist of some hard wood. If soft wood is used the floor should be covered with linoleum. Floors may be made sound-proof by a construction of double floors with felt paper between or by filling in the beams with mortar. Red oak and hard pine are good for floors. With the heart-wood side up the wood wears better. The pores of the wood should be filled with some durable substance. Hard-wood fillers, coal tar, or paraffin may be used. The last is somewhat expensive. If possible the wood should be made fire-proof with chemicals. If the floor is oiled care should be taken that the oil does not remain on the surface. After the oil has been applied any surface residue should be absorbed by sawdust and dried with rags.

(*c*) *Wall.* The lower portion of the wall should be protected by a band of wood. About a meter over this should be a similar band somewhat narrower. Between them should be mortar cement or some similar substance. Wooden wainscoting collects dust and is unsanitary. If bands of wood are not used in the manner suggested the wainscoting may be filled in with tiles.

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Over the top band of wood there should be a border of light green burlap fastened at top and at bottom for purposes of exhibition of work, decoration, and the like.

(*d*) *Door.* The doorway of the room should be about 1.5 m. wide. The room door should open inwards. This is necessary in order that the teacher can control and hold the class in time of fire, panic, or the like. The doors at the school entrance, however, should open outwards. This is necessary to prevent the congestion due to the numbers which use any single stairway. With a single class such congestion need not be feared.

(*e*) *Closet.* Each room should be provided with supply closets which are commodious enough to hold the material necessary for modern instruction. Closets should reach from the floor to the ceiling wherever possible. It will cost little more to extend them straight to the ceiling since fancy top, fastenings, etc., will not be necessary. The total closet frontage should equal the side of the room, preferably the long side. The depth of the supply closet should be from 4 dm. to 5 dm. In addition to the closet reaching from the floor to the ceiling, there should be a small closet about 2 dm. deep directly under the blackboard. The top would form a convenient shelf for demonstration, exhibition, etc., and could readily be cleaned. In each room there should be a ladder in the high closet.

(*f*) *Sink.* Each room should be provided with running water. Ordinary dwelling places, stables, and the like usually have running water near at hand and it is reasonable to ask that a room which has in it

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from thirty to sixty children be similarly equipped. For drinking purposes, for cleanliness, etc., running water is necessary.

(*g*) *Sand table.* Each classroom should be provided with a zinc-lined sand table from 5 dm. to 1 m. wide and from 1.5 m. to 2 m. long. Such tables at times are found in the kindergarten, but for upper classes they are usually not provided. For intensive study of geography they are necessary even for adults. In history, nature study, science, and literature they may be used. For certain phases of number work they are helpful. Such tables should slope slightly towards one corner which should have a hole and a stopper.

(*h*) *Blackboard.* A blackboard 1 m. wide should run along the front of the room. It should consist of a green or black slate placed about 1 m. from the floor. For primary classrooms it should be placed somewhat lower, from 6 dm. to 8 dm. from the floor. A trough should be at the bottom of the board to hold chalk dust, chalk, etc. The board should be framed and fastened to the wall. Slated canvas, painted board, etc., should be considered only as makeshifts. With the blackboard should be provided erasers which take up chalk readily. The usual board rubber is a cheap kind of scraper which scatters the dust about. A soft woolen or cotton rag or a proper eraser should be supplied.

No blackboards should be placed at the sides or rear of the room. They can not be used for demonstration purposes and work done by pupils scattered along the sides of the room can be done more conveniently and naturally on paper. We seldom do work in afterlife on blackboards and the work of the children on

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paper is none too good. The relief which work at the board affords the children can be obtained by having them work on their feet before their desks, and free-arm movements can be similarly obtained. The dust raised by twenty or more pupils working at the board at once is not conducive to the health and well-being of the children who breathe it in. Instead of blackboards a light-green border of burlap or similar cloth should be fastened at the sides and rear of the room wherever the surface will permit. This cloth should be as wide as the blackboard and should be placed as high from the ground. It should hang loose from the wall and stretched between an upper and a lower molding fastened to the wall. Cloth of such a color is pleasing to the eye, it does not absorb light, and it can be used as a background on which to pin exhibition work, and the like.

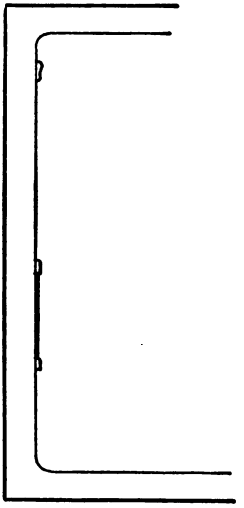

FIG. 14. — Side of wall showing burlap strip.

(*i*) *Color of room.* The color of the ceiling should be white. The wainscoting should be a medium grey-green. The walls above the wainscoting should be a light grey-green. The woodwork should be of the color of weathered oak, or a dark grey-green. These colors harmonise and are pleasing and restful. The narrower moldings may be colored a dark green, or a rich mahogany. The most fatiguing, distressing, and inartistic color for either the walls or the woodwork is the dirty yellow which is sometimes used. An expanse

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of unbroken yellow is extremely irritating to the eyes. The use of oak for furniture, moreover, makes it necessary to use a color other than that of the desks, floor, etc.

7. **Furniture.** The desks and seats of the children should be something more than slats screwed to iron supports. They should be so designed as to afford comfort to the children and at the same time allow of effective school work.

(*a*) *Spacing.* If the room is 10.5 m., 7.5 m., and if the space reserved for desks and seats is 9 m., 6 m., or, allowing a space of 1 m. between the first row of desks and the board, 8 m., 6 m., this will give a total floor space of 2 sq. m. for each of fifty pupils and a desk and seat space of about 1 sq. m. If the desks are 5 dm. wide this will allow of individual desks with aisles 5 dm. wide. The teacher's desk can be placed at the side or rear of the room or in front of the middle row of seats.

(*b*) *Back of seat.* The back of the seat should have two curves, one in the vertical and one in the horizontal plane. So that the body will be supported at a number of points the back of the seat should be curved from right to left. Up and down it should have a compound curve and it should be inclined slightly backwards. The back should reach up to the armpits. The swivel office chairs used are good models to follow in this connection.

(*c*) *Seat.* The seat should be narrower than the pupil's thigh. It should be saddle-shaped, with depressions. The seat should be high enough to allow the pupil to sit with his feet flat on the ground. The front of the seat should be so constructed as to afford a sup-

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port to the child when he stands for any length of time, or when he is working on his feet. Movable parts are not to be recommended as there is danger of injuring the child in some manner.

(*d*) *Seat and back fixtures.* The seat and back should be attached in such a manner that they can be tilted backward about 1 dm. This will allow pupils to sit in relaxed positions, with legs outstretched and body properly supported.

(*e*) *Arm rest.* Arm rests should be so placed that the child's elbow when hanging loosely will receive support. Arm rests allow the child to sit with chest thrown out. When hands are in the laps this is not so readily done. The chest must then carry the weight of the arms and so must contract slightly. Hands placed behind the back is an unnatural and harmful position. From the side of instruction it is a sign that not much is being done as far as the child is concerned.

(*f*) *Desk and seat support.* The iron support of the seat should have smooth surfaces without any of the rococo ornamentation usually attempted. It should meet the floor evenly so that no dust can accumulate under it. The seat and back should be adjustable in a vertical direction by a rod which can be securely fastened. Any device which is used should be easily manipulated by the children themselves, if necessary. A pin and hole might be employed. The nut and screw sometimes used are not readily controlled, especially if the nut becomes rounded or the screw-thread rusty. The device used in the revolving office chair is good for this purpose. The seat should also be adjustable in a vertical direction. The device should be readily controlled as in the case of the seat.

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(*g*) *Desk and seat distance.* With reference to the desk, the seat may have three distances, plus, zero, and minus. In *plus distance* there is a space between

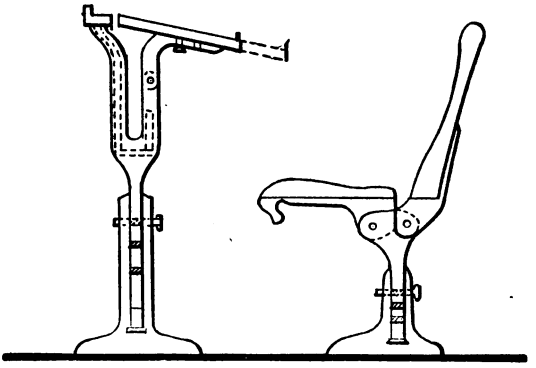

FIG. 15. — Desk and seat with adjustments.

the edge of the desk and the edge of the seat. In *zero distance* the two are on a line. In *minus distance* the edge of the seat is under the desk. Minus distance is necessary for such work as writing, figuring, drawing, and the like. To change a plus distance to a minus distance the desk top should be movable. It should move readily in a backward or forward direction in an iron groove. The various measurements which may be consulted in the case of desks and seats are given below in a table.

FIG. 16. — Plus, zero, and minus distances.

(*h*) *Desk fittings.* Each desk should have two inkwells, one for red and one for black ink. An extra inkwell for red ink is less expensive than the bottled

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red ink which is usually used. The inkwell should be so shaped as to afford little surface for evaporation or the collection of dirt. A cuspidor-shaped well fills such requirements. The wells should fit in a metal ring provided with a metal cover. In addition to the two wells each desk should have a larger well for water. Such wells are necessary for color work, modeling, pasting, and the like. There should be a frequent cleaning of these wells. The desk top should have a deep receptacle for pencils, rubbers, pens, etc. The usual groove is inadequate as it exposes supplies and allows of pilfering and theft.

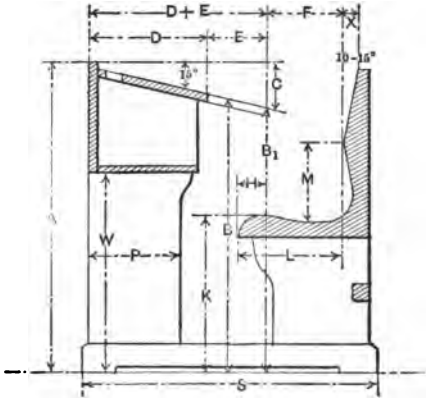

FIG. 17. — Desk and seat to accompany table on page 218. Burgerstein, L., and Netolitzky, A., *Handbuch*, 186.

§ II. PASSAGEWAYS

1. **Entrances and exits.** The school should have two or more entrances. The entrance should be 1 to 2 times as wide as the stairway. It should be provided with a vestibule and storm doors. The doors should open outwards. For the inside entrance two narrow and close-fitting swinging doors might be provided.

2. **Stairways.** All stairways should reach from the top of the building to the street. They should be constructed of stone and iron and should be encased in

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STANDARD MEASUREMENTS BY THE VIENNA COMMISSION. BURGENSTEIN, L., AND NETOLITZKY, A., *Handbuch*, 137.

Number of desk	Average age of pupils	Height of pupils	Desk-Top									Seat			Depth of desk support	Depth of seat and desk	Length of desk	Height of compartment	Inclination of back of seat
			Outer height of desk-top	Inner height of desk-top	Height of desk-top when extended	Inclination up to 15°	Distance when not extended	Distance for adjustment	Total depth	Distance between extended desk-top and seat	Minus distance with desk-top extended	Height	Depth	Distance between thickest part of back and seat					
		Cm.	A	B	B_1	C	D	E	D+E	F	H	K	L	M	P	S		W	X
I	6- 8	102-117	65.25	57.5	54	10.25	25.5	12	37.5	20	5	31	25	19	21.5	63.5	48	39	2
II	8- 9	118-125	68.25	60.5	56.5	10.25	23.5	15.5	39	20	5.5	32	25.5	21.5	22	65.25	50	40	2.25
III	9-10	126-134	73	65	61	11	24.25	16.25	40.5	21	5.5	34	26.5	23	22.5	68	52	42	2.5
IV	10-11	135-144	75.25	67	63	11.5	26.5	16	42.5	22.5	6	36	28.5	25	23	71	53	46	2.5
V	11-12	145-154	80	71.5	67	12.25	28	17	45	23.5	6	40	29.5	25	23.5	74.75	56	53	2.75
VI	12-13	155-164	84.5	76	71	12.25	26	19	45	24	7	42	31	27	24	76	60	59	3
VII	14	165-174	88.5	80	75	12.5	28	18	46	24	4.5	45	28.5	29	24.5	78	60	62	3

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brick or concrete walls. Landings should be placed at proper intervals. Between any two landings there should be from 6 to 10 steps. Each step should be about 15 cm. high and about twice as deep, the ratio of riser to tread being 1: 2. The width of the steps should be about 1.5 m. Stairways should not be open but should be boxed with ironwork reaching from top to bottom. Two handrails should be provided one for smaller children, and 50–60 cm. high, one for larger children, and 75–80 cm. high. Stairways might be placed on the outside of the building so as to afford additional means of exit in case of fire. If possible all stairways should have windows at the landings.

3. **Halls.** The halls should consist of fire-proof material. The floor should consist of concrete, stone, or brick. Asphalt, cement, and the like wear off too rapidly and give a heavy dust. Halls should be from 1.5 m. to 4.5 m. wide. They should be heated directly by coils placed near exposed exits and entrances. If direct lighting is not possible, light may be had through door transoms or windows set in the walls of the rooms. All such windows should be filled with factory-ribbed glass. This diffuses light and also shuts out distracting views. Halls should be provided with ducts and outlets for water so that they can be flushed in cleaning. Hose connections should be inserted at convenient places so that the danger from fire may be lessened.

§ III. Outside Rooms

1. **Coat rooms.** Each classroom should be provided with a separate room for coats, umbrellas, etc. The room should be so situated that the children can pass

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into it, hang up their clothing, and go directly into the classroom. Coat rooms should not be placed too far from the classroom. The dimension of the coat room should be 2–2.5 m. by either length of the classroom. This will give a floor surface of about 20 sq. m. Rooms should be properly ventilated and heated. Damp clothing will then be properly dried when the children come for them at dismissal. If possible no wardrobes

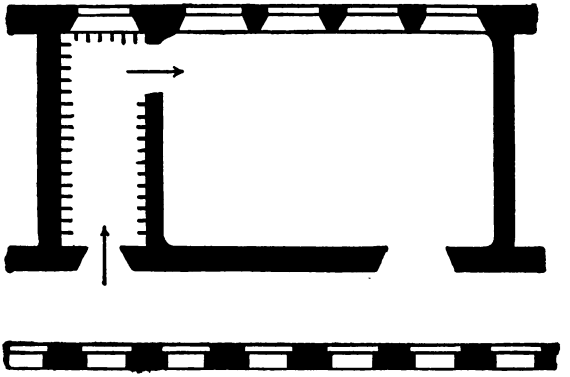

FIG. 18. — Coat room on short side of the room. Burgerstein, L., and Netolitzky, A., *Handbuch*, 394.

should be in the classroom. The stench met with from wet and dusty outer garments should be a sufficient objection to a return to the older form of wardrobe.

2. **Storerooms.** The various spaces in the building over stairways or elsewhere can be fitted up as supply closets. Since a great deal of inflammable material is stored in such rooms they are centers of danger. They should therefore be lined with stone and sheet-iron so as to be fire-proof. Each room should be properly ventilated, lighted, and warmed with a steam

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pipe passing through. There should be about 2 cu. m. of storeroom space for each classroom.

3. **Teachers' rooms.** The school should have an office for the principal, one for each assistant to principal, and for the teachers one or two reading rooms, a toilet room for every six teachers, and a lunch room for every ten teachers. Since the teacher is the unit upon which school efficiency, for the most part, rests, every means should be taken to secure living comfort for him. The floors of such rooms should be covered with linoleum. This is durable and is readily cleaned. Carpet collects dirt and can not be scrubbed while it is on the floor. The windows of all toilet rooms should be filled with factory-ribbed glass. Ground glass should not be used since it shuts out too much light. Ventilation, heating, and lighting should be provided as in the classroom.

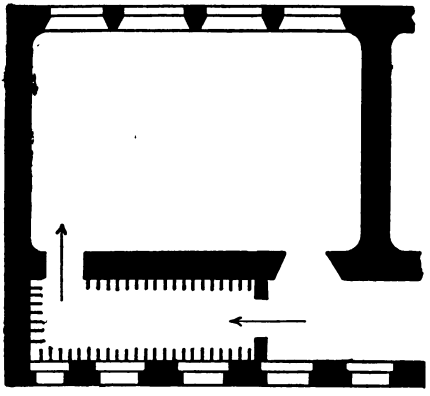

FIG. 19. — Coat room of a corner room.

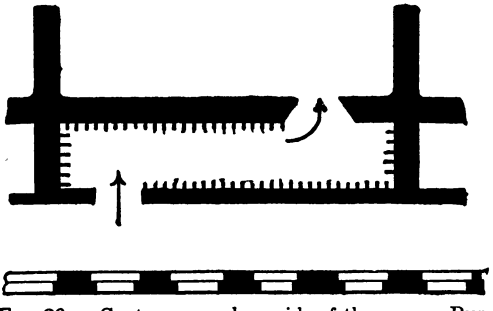

FIG. 20. — Coat room on long side of the room. Burgerstein, L., and Netolitzky, A., *Handbuch*, 395.

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§ IV. Yards and Grounds

1. **Playground.** The playground should be in the open or in the direct light of the sun. If it can not be had in the open it may be placed under cover on the roof. A wall about 4–5 m. high should enclose playgrounds which are on street level. Playgrounds should have concrete or brick floors. Gravel is not to be recommended as children slip on the pebbles. Sod is to be avoided as it retains water. The playground surface should be as large as the ground covered by the school building. This is the case with roof grounds. A school in a public park would allow of proper playground space. In country schools or in schools in city suburbs a lawn should be provided at least twice as large as the ground on which the building as such stands.

2. **Inside yards.** Yards which are inside of the school should be fitted with stone or concrete floors. Wooden floors are too noisy. The yard should have a long, white-enameled sink with a number of white-enameled drinking cups. The sides of the wall might be tiled with white tiles. The yard windows should be protected with stout wire screens. Heating and ventilation should be provided as in the case of the halls.

3. **Toilets.** Children's toilets should be placed in outhouses connected with the school by covered paths. In large schools, toilets should be placed on each floor in separate wings or towers and should be ventilated and warmed. Basement toilets are advisable where proper ventilation and sewerage can be had. If toilets are placed on the school floors the floors and walls of

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the toilets should be tiled. Wash-bowls with soap and towels should be in each room.

Closets should consist of separate bowls with adequate flushing arrangements. Trough closets or latrines with continuous bowl and intermittent flush pollute the air and are wasteful of water. They should be permissible only in open-air outhouses. There should be one seat for every twenty-five boys and one for every fifteen girls. For smaller children smaller seats and bowls should be provided. Urinals should consist of slate stalls with a continuous drain and an automatic flush. The stalls should be separated by partitions which should not reach entirely to the floor. There should be one stall for every fifteen boys.[18]

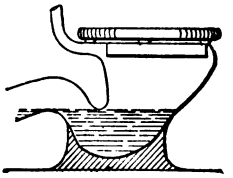

FIG. 21.—'Wash-down' bowl.

Toilets should be floored with white tiles or bricks. The walls should also consist of white tiles or bricks. Each toilet should be provided with a drain and outlet so that the floor, walls, etc., can be flushed. They should be well lighted and ventilated. Proper cleaning and ventilating are all that are necessary to keep away odors. Deodorants should not be used as they usually sub-

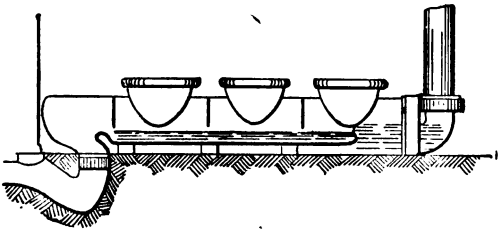

FIG. 22.—Trough closet or latrine. Fletcher, B. F., and H. P., *Architectural Hygiene*, 72, 79.

[18] See: Gerhard, W. P., *Sanitation of Public Buildings*, 146–154; Fletcher, B. F., and H. P., *Architectural Hygiene*, Ch. VIII.

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stitute one smell for another. If connections can be made with the sea the toilets should be flushed with sea water.

Where water for flushing can not be had dry closets are necessary. The pail system in which movable receptacles are used is not to be recommended. The 'conservancy' system is to be preferred. In this system dry earth of as loamy a nature as possible is placed at the bottom of the pail and over the excreta. This turns the excreta into a kind of vegetable mold. Sifted ashes may also be used. Such receptacles should be emptied, cleaned, and disinfected every morning. Another method of disposing of excreta is to pass warm air through the latrines. The dried excreta may then be saturated with oil and burned.[19]

All toilets should be regularly inspected once or twice a week by the principal or head of the school. It should be done after sessions or before sessions when none of the children are in the building. Before sessions is the best time for inspection since then the cleaning may be supposed to have been done by the janitor.

4. **Rooms for special instruction.** For special work in cooking, shopwork, gymnasium, etc., special fixtures and larger floor space are necessary. In other details the requirements are much the same as for the other rooms.

(*a*) *Gymnasium.* The gymnasium should be in the shape of a rectangle with the sides in the ratio of 2 : 3. The floor space necessary for each individual can be calculated on the following basis: The distance between

[19] See: Burgerstein, L., and Netolitzky, A., *Handbuch.*, 380–386; Shaw, E. R., *Sch. Hyg.*, 113.

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the finger tips of the outstretched arms of a large boy is about 2 m. From his back to the tips of his fingers stretched forward is 1–1.5 m. This will give about 3 sq. m. for each pupil who is actively engaged. In addition there should be at least 2–3 m. distance between the teacher and the class, and at least 3.5 m. extra space at each side and the rear to allow the pupils to take about five steps in any direction. The height of the room should be 5–6 m.[20]

The floor and the apparatus should be constructed with a view to cleanliness and the exclusion of dust. Mats should be covered with leather and tightly sewed. Linoleum is good for floor covering. To clear the air after a lesson water may be sprinkled from a hose or special device fixed at some distance from the floor. Light may come from both sides and from the top. In the pavilion system the gymnasium is placed in a separate building on the grounds. If the gymnasium is in the school building it may be placed on a floor apart from the other floors. If possible, dressing rooms should be placed near the gymnasium room and provided with lockers. Shower baths should also be provided. Shower baths should be built near the dressing rooms so that a child can pass directly from the dressing room to the bath room. One may be placed in the rear of the other. Bath apartments and dressing need have but little more floor space than is necessary to allow a child to turn about.[21]

(*b*) *Workshop.* For carpentry and woodworking each pupil should be allowed about 3 sq. m. of working floor

[20] Burgerstein, L., and Netolitzky, A., *Handbuch.*, 346.

[21] *Ibid.*, 346–354; Kotelman, Ludwig, *School Hygiene*, Eng. tr. by John A. Bergstrom, and Edward Conradi.

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space. Each bench should be about 1 m. long, .5 m. wide and about as high as the ordinary desk. It should be provided with a locker for tools, etc. There should be closets along the walls for the storing of supplies, and for the exhibition of finished and unfinished work. Demonstration table, blackboard, etc., should also be provided.

(*c*) *Drawing room.* A room for drawing should be as large as the standard classroom. Floor space *per* pupil should be from 2 m. to 2.5 sq. m. If light can be had from the top the room can be somewhat wider and longer, about 2 m. each way. Easels should be adjustable vertically and should have a drawing surface of 60 cm. × 90 cm.

(*d*) *Cooking room.* Cooking rooms should be fitted with tables or stands each of which is supplied with a gas burner, zinc-covered top, locker, etc. The table should be about 1 m. long and .5 m. wide. The working floor space for each pupil should be about 2 sq. m. The room should also be provided with closets, ice-box, sink, demonstration table, desk, etc.

§ V. The School Building

1. The Snyder H-school.[22] The Snyder H-school consists of a building in the form of the letter **H**. The courts are on the outside and all the rooms receive daylight without interference. Where a school reaches through a city block or square the school is built so that the middle bar of the **H** is in the center, and the

[22] This form was devised by C. B. J. Snyder, Superintendent of School Buildings, New York City. I have been unable to secure plans for purposes of illustration.

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two side wings are at right angles to the street. The wings receive direct sunlight and at the same time do not interfere with the light of the other parts of the building. If the school does not reach through, the block or square half of the H-form will allow of an open court and direct light to the rooms.

2. **Movable buildings.** Where the population is small and variable, movable schoolhouses with but few classrooms should be constructed. These should consist of separate parts which can be rapidly put together or taken apart as the case might be. Such a school can then follow the population wherever it may go.[23]

3. **Pavilion system.** Where land is not too expensive large grounds can be filled in part with buildings similar to those arranged on university grounds. A whole block or square could be devoted to this purpose. Some of the buildings should be devoted to regular instruction, others should be fitted up for gymnasium, cooking, or other special instruction. The grounds allow of free play, open-air gymnastics, games, and the like. Parental schools should be constructed on the pavilion system. Buildings need not be as high as the regular school building.[24] In the suburbs land should be purchased for this purpose.

4. **Height of the building.** For a regular school the number of stories should not exceed five or six. Toilets should be in the basement and on the top floors. If more schools are needed, the schools should not be built any higher, but more land should be appropriated for the purpose. Congested conditions in cities would

[23] Maxwell, W. H., Annual Report, The City of New York.
[24] *Ibid.*, 72–75.

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be somewhat relieved if more public buildings were erected instead of dwelling houses.

5. **Location.** The grounds selected for school purposes should be high and dry and within easy reach of the children. There should be a free circulation of fresh air and sufficient direct light for all the rooms. The rooms of the building should face in an easterly or southerly direction. If rooms are on both sides of the building as in the H-school this exposure is not possible. About 3 sq. m. of ground *per* child should be allowed.

6. **Material.** No school of any size which is not fireproof should be constructed. Brick, stone, concrete, and iron should be the materials used for the walls and supports. Rooms which are used as storerooms should be built of brick or stone. The boiler room should be shut off from the rest of the building by sheet-iron doors. Coal bins should be built of brick. No wooden supports of any kind should be tolerated in the boiler rooms. Where the frame of the building consists of steel and fron, most of the space facing the direct light of the sun can be filled in with glass. If the walls are needed for support the buttress system used in churches might be employed to allow of as much window space as possible.

7. **Renovation.** Renovation of the building and the room fixtures should be made whenever it is necessary. The color of the walls, woodwork, etc., has already been suggested. Renovation will allow of necessary changes if the proper color is not present. Factory-ribbed glass should gradually replace the ground and other glasses which obstruct the light. Proper shades should be put up. Moldings should likewise be replaced. Sheet-

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iron doors for boiler rooms, stone walls for supply closets, etc., should be provided. Additions in the way of cooking rooms, and the like may be made from time to time. In this manner many of the antiquated school buildings may be made more modern and effective for purposes of instruction.

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CHAPTER VI

THE SCHOOL PERSONNEL

§ I. Classification in General

Within the school the class teacher is the unit upon which most of the superstructure rests. In considering the school in its relation to the social whole, however, other officials are of account. Briefly, these are (1) the superintendent, (2) the principal, (3) the assistant to the principal, (4) the special director, (5) the special teacher, (6) the medical inspector and assistants, and (7) clerks, janitors, etc. Each will be treated in brief under the appropriate headings.

§ II. The Teacher

1. **Men *versus* women.** The distribution of men and women as teachers of the children in a school system involves not difference in degree, *i.e.*, superiority or inferiority, but rather a difference in kind. In her own work the female teacher is just as good as the male teacher, but her genius lies in a somewhat different sphere. The question of sex enters, and here it is not a matter of size of muscle or weight of brain, but a question of deeper constitutional differences both psychological and ethical, which can not be changed by popular agitation or legislative decree. In part, such differences are well expressed in the following:

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> The woman, conserving the effects of past variations, has what may be called the greater integrating intelligence; the man, introducing new variations, is stronger in differention. The feminine passivity is expressed in greater patience, more open-mindedness, greater appreciation of subtle details, and consequently what we call more rapid intuition. The masculine activity lends a greater power on maximum effort, of scientific insight, or cerebral experiment with impressions, and is associated with an unobservant or impatient disregard of minute details, but with a stronger grasp of generalities. Man thinks more, woman feels more. He discovers more, but remembers less; she is more receptive, and less forgetful.[1]

The effects of these and other differences are seen in instruction and discipline, and should be considered when teachers are assigned to classes.

For the dogmatic discipline necessary for younger children women are to be preferred to men. For the expanding individuality of adolescents, for their aggressive initiative and blind strivings at self-realisation, however, male direction becomes necessary. A woman tends to suppress children more and to confine their activities along some beaten path. The general loosening of discipline in certain directions which is necessary in the case of older boys is sometimes looked upon by women as a species of anarchy, and the 'disciplinarian' will often consider a man's control weak on that account. For adolescents, however, suppression is ineffective as far as the development of social self-control is concerned. The more liberal attitude which is taken by men in this connection makes them better fitted to control older boys in an effective manner.

In instruction, too, sex differences enter. A boy, because he is a boy who must later associate with men, requires experience and contact with men of culture and

[1] Geddes, P., and Thomson, J. A., *The Evolution of Sex*, 271.

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training. If the school is to interpret and present to the boy the experience of the race, it must use those channels by which the race has come to its own. Instruction must therefore receive a coloring which can be given only by men. In the present age of dilettanteism and conventionalism we are prone to forget that the race has reached its present stage by blood and iron. This aspect alone will be tinged one way or the other according to the sex of the teacher. Again, there are aspects of the social heredity of the race which can be best interpreted and appreciated by male teachers. Science, industry, commerce, etc., have reached their present position by male effort and can be better presented and emphasised by male instruction. The very manner, tone, and gesture of the teacher will show a difference when measured by the standard of sex. While the child is preadolescent he has little need of an exact and particularised presentation of these phases of man's work. When he reaches adolescence, however, a closer study becomes necessary. In both instruction and discipline, moreover, the adolescent boy needs the example of a man to guide him. Usually the child comes into contact with illiterate and uncultured men and requires some better type of his own sex with which he can come into contact.

Because of the differences just mentioned no boys in the last two or three years of the elementary school, and no high school boys should be placed in charge of a woman, and no woman should be placed in charge of any school which has classes of the last three years of school. There will be no discrimination against female teachers in this since there are sufficient girls

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in all grades to provide classes for women. There is likewise no implication of inferiority or superiority one way or the other since the work of women in their own sphere is just as good and worthy of just as much commendation as that of the men. The whole matter is one of kind and not of degree.

2. **Class teacher.** The class teacher has already been discussed in the first volume. A few other points may here be noted. The class teacher should be able to teach a little more than the three R's. Thus, music, drawing, construction work in wood or cardboard, physical training, etc., are not so abstruse or complicated that the teacher can not master them with a thoroughness sufficient for purposes of instruction. When such subjects are added to the curriculum the teacher should study references, take courses, if necessary, and make some attempt to keep up with his work.

So that the rights of the teacher may be safeguarded there should be some definite standards in instruction and discipline by which he can judge his own work and which will also guide the action of his superiors. There should be criteria which will indicate to some extent efficient methods in instruction and discipline. Anything will be better than the aimless and biased methods by which at times instruction and discipline are carried on and by which they are judged.

3. **Special teacher.** Some subjects the class teacher can not be expected to teach. Such are, the foreign languages, stenography, workshop, sewing, cooking, etc. In such cases a special teacher is assigned to one or more schools and takes the classes during their instruction in the special subject concerned. The special teacher should have the same official stand-

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ing as the class teacher. In the high school and college this holds, and it should apply in the elementary school. In instruction and discipline the special teacher should be held responsible by the principal as is the class teacher. The same criteria should be used in both cases.

4. **Special supervisor.** For such subjects as drawing, music, physical training, etc., which are taught by the class teacher, but of which the principal is supposed to know nothing, special supervisors are usually appointed. Their duty is to supervise the work in their specialty and to coöperate with the class teachers in instruction. Such supervisors have no classes, are assigned to several schools, visit each school one day a week, and coöperate with the class teachers. Cooperation with class teachers in instruction and supervision, as already discussed, is their work. Special supervisors are a growth by accretion and the result of the addition of new subjects to the curriculum. They tend to distribute responsibility in the instruction of their specialities and so weaken the work in special subjects. The short time which is allowed them to visit the rooms renders their coöperation in supervision and instruction more or less ineffective, and the fact that the subjects are in their charge often renders the principal or head of the school indifferent to inefficiency in special instruction. If the principal needs guidance in special subjects he should receive instruction from the directors in charge. Handbooks with suggestions on method would also aid in giving principals a knowledge and appreciation of efficiency in instruction of such subjects as are concerned.

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§ III. The Principal

The rights, duties, etc., of the principal have been discussed in full. His relations with other officials here requires brief mention. The principal should be held strictly accountable for effective instruction in all the subjects of the curriculum. If special subjects demand it, he should keep in touch with the special directors. From pamphlets, conferences, etc., he should find out what are the requirements in subject matter and method, and should then coöperate directly with the teacher without intermediation of the special teachers. If special teachers are present, the principal should none the less supervise the special subjects in his school and if necessary, the special supervisors also. He should not hesitate to inspect a lesson in singing or examine a class in drawing.

As the principal should be held accountable for his school, so he should have full control over the material and personnel in it. Regular teachers, special teachers, visiting physician, nurse, janitor, cleaners, etc., should all receive their instructions, in part, from him. This implies, also, that the principal should have charge of the whole school. Separate principals for primary and grammar departments are not only more expensive but also less effective than a single head for the whole school with subordinate assistant. The powers of the principal should be definitely set forth. He should know exactly what is required of him and what standards he should apply in coöperating with the teachers.

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§ IV. The Assistant to Principal

When a school has thirty classes an assistant to principal should be assigned to aid the principal in his work of coöperation with the teachers. For every fifteen classes over thirty an additional assistant should be assigned to the school. Where the classes in charge of an assistant are in the first five years, a woman should be assigned. Where the classes are boys' classes in the last three years, a man should be assigned. In fact if there are two assistants in a school, one should be a woman, and one a man, for much of the work of the second assistant assigned to the school will be concerned with the higher grades of boys. No man should be assigned to a girls' school.

A principal may assign an assistant to specific grades in all subjects, or to all grades in some special subject or subjects. In the former case, the assistant assumes full charge of all grades, from kindergarten through the third year, for example. In such a case she acts as a principal within the restricted sphere assigned to her and coöperates with the teachers in instruction, discipline, and supervision, as does the principal. She reports to the principal, receives his suggestions, and is held responsible by him for effective instruction and discipline in her department. In the latter case the assistant takes charge of some subject in all the grades and is held responsible by the principal for efficiency in the instruction of the subject selected. In both cases the assistant gives additional help in organisation and classification.

Neither method by itself is a good one. Since the principal is the head of the school he should keep in

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touch with all parts of it. If he gives an assistant full charge either of grades or of subjects he loses control to that extent. Moreover the teachers at all times should feel that they are directly responsible to him. The assistant should have charge of some department or series of grades but in a restricted manner. She should assist in the school management (1) by inspection of the work done by the teachers under her, (2) by suggestions and reports on possible improvements in instruction and in discipline, (3) by reports on inefficient work, and (4) by aid in the organisation and classification needed in the school. If the principal thinks it advisable he may require coöperation in instruction and discipline to the extent outlined in the first volume. The principal, however, should visit all the rooms and should satisfy himself on matters of classroom work. The mark of the teacher should be based on his own observations and on a verification of the reports given to him by the assistant. If the assistant is assigned vertically to some subject in all the grades she becomes simply another special supervisor and increases the defects of such supervision as described in a preceding section. If, moreover, there is only one female assistant, vertical supervision and coöperation in a few subjects would in boys' schools necessitate female control of adolescent boys, which is objectionable for reasons already stated.

§ V. The Superintendent

The superintendent forms a connecting link between the various schools of a district and between the school and the public as represented by the school boards.

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His duties include coöperation with the principal and teachers.

In inspecting a school the superintendent should look for the different signs of efficiency indicated in these two volumes. First, the general condition of the building itself should be noted. The cleanliness of the halls, yards, sinks, toilets, etc., the decoration of the building outside of the classrooms, the condition of and the order in the supply rooms and storerooms etc., are here included. The material and supplies should be inspected. These alone will tell much about the means which the principal considers effective in instruction. The various records, books, reports, etc., kept by the principal are also included. In all this it is seen that inspection of such material things is made as the principal controls directly without reference to the teachers or their class work.

The next matter to be inspected is the work of the principal which affects the children and which in part is due to coöperation of the teachers. Thus, the entrance and dismissal of the pupils, the opening exercises, the various means by which pupils are led to coöperate, the condition of the children's books, and the like are indicative of much which is done by the principal. What should be closely noted is the principal's control of the children in his classification and organisation of them. The superintendent should closely inquire into the bases of classification in use, the method of examination, the means of advancing bright pupils more rapidly than the others, the plan of regular promotion, the treatment of atypical children, the care of sickly children, and the like. Further aspects of organisation should be examined. The principal should be

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held responsible for proper daily programs, for plan books, for the proper distribution of supplies as shown by supply sheets, for the written instructions and directions which are given, for records of attendance and absence, for records of the teachers' attendance and absence, and the like.

For such inspection the superintendent need not enter a single classroom. Classroom inspection should be made apart from the inspection just indicated. In passing through the classrooms the superintendent should be guided by the outline suggested on efficiency in instruction and discipline. Efficiency in instruction and discipline, effort, preparation, and personal manner of the teacher should be noted as suggested in the first volume. In addition, the superintendent should note the pupils who are overage, who seem to be brighter than the others, or who seem to be underfed or anemic. If any such are found he should interrogate the principal. The remedies suggested and the steps already taken will show the standpoint of the principal in the improvement of the condition of such children.

In visiting the classrooms the aim of the superintendent should be not only to test the efficiency of the teacher but also to find out to what extent the work of the principal is evident. Should the teachers appear inefficient in any particular the superintendent should have no words with the teacher but should bring the matter before the principal. He should find out what the principal has done to assist such teachers. The principal should be absolved from responsibility only when he has shown that he has coöperated with the teacher in an effective manner.

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Since the superintendent can stay in the rooms for only a short time during a single visit he should probe more deeply if inefficiency appears to be present. He should not be satisfied with a snap judgment nor consider that inefficiency is present from a ten-minute visit. He should pay a number of visits, quiz the class, and, if necessary, give the teacher notice and ask for a model lesson in some subject. The method of class inspection should be much like that of the principal. Since he has but little time at his disposal the superintendent should look for as much manual and written work as possible, as clay maps and models, woodwork, concrete work in arithmetic, written work and the like. He should satisfy himself that the course of study is being enforced. The various written suggestions, conference notes, model lesson outlines, etc., should be inspected.

In his more formal inspection of the school the superintendent should have a book with printed headings which may be checked off or noted. Some such guide as the following might be used:

I. Building
- halls
- stairs
- yards
- toilets
- etc.

II. Material
- amount of supplies
- kind
- selection
- care
- distribution
- record

III. Organisation
- records
- dismissal
- entrance
- opening exercises
- coöperation of pupils

IV. Classification
- bases in use
- method of promotion
- use of examinations
- special classes

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V. Teachers	VI. Principal
efficiency in instruction	personality
efficiency in discipline	personal manner
effort, preparation, personal manner	effort
	preparation
	coöperation (Vol. I.)
	etc.

It is not necessary for the superintendent to make a voluminous report under each of these headings. A rapid survey will be sufficient in the case of many of the items. The different points may then be checked off. Should anything be wrong, however, a few notes can be made under the heading in question.

To enforce his inspection and to promote the efficiency of the principals in his district the superintendent should hold conferences, give personal advice, issue orders, and help the principals in much the same manner suggested in connection with the principal-teacher relation. Conferences with the teachers may also be held. In these, some of the principals and special directors may be asked to speak.

Since the superintendent is responsible to superior boards he should send in reports and should offer suggestions for the betterment of the schools in his charge. He should keep the school boards informed of the condition of the buildings and should suggest renovations or additions whenever necessary. The care shown for the children should be a constant source of attention. He should keep in close touch with all phases of instruction so as to be able to suggest means both of improving the course of study and of bettering the methods used in instruction and discipline. The work of the teachers and their efforts at self-improve-

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ment should be noted and encouraged. Other matters, as the rating of teachers, the investigation of complaints, the tabulation of records, etc., are usually definitely stated by the school boards.[2]

§ VI. The Special Director

There can be no doubt that special directors are necessary for such subjects as drawing, music, physical training, and the other special subjects. They should, however, work directly through the principals. They may hold conferences from time to time and offer suggestions to superintendents and principals. Pamphlets, handbooks, printed suggestions, etc., should be issued by them. When such suggestions and directions reach the teachers and principals indirectly through the special supervisors and teachers they lose much of their force and value.

§ VII. The Janitor

The janitor is responsible for the care of the building with respect to (1) cleaning, (2) warming, (3) ventilation, (4) repair of damage to windows, woodwork, etc., (5) assistance to teachers in classroom matters. He should inspect the work done by the helpers under him, keep some record of it, and suggest improvements to the principal. He should report daily to the principal and remain in the building during school sessions.

[2] A similar scheme of supervision has been outlined by Superintendent Andrew W. Edson of New York City in his conferences and also in his Columbia lectures.

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§ VIII. The Clerk

The clerk should keep the school records and do the work implied by the term 'clerk.' The position implies, in addition, loyalty, trust and responsibility. No clerk should remain in a school where these elements are absent.

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CHAPTER VII

THE FUNCTION OF THE SCHOOL

§ I. The Work of Man and the School

Whether one considers the instruction and discipline in the school from the standpoint of 'power' or content, one must acknowledge that whatever is done in the school is simply a means of fitting the child for commercial, industrial, social, ethical, and other control. The school must be considered as an intermediary in this connection. It does not lay down dogmatic laws which are to be followed by the world outside, but rather it studies closely all external conditions which are to act on the child when he leaves school. No doubt, the school in part does the work of reform, but in great part, too, it does the work of preparation according to the most effective and modern standards in use. Instead, then, of theorising on the relative value of subjects, instead of forming deductive conclusions on the use of this or that subject as a means of fitting the child for future control, it might be well to see what are the activities of man as they are met by the child when he leaves school. The following tables given for this purpose are based on the different numbers of the *Statesman's Year-Book:*

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FRANCE 1901

OCCUPATIONS	MALES	FEMALES
Not specified	18820	46708
Fishing	67772	71626
Agriculture	8176569	8430059
Extractive industries	266351	226815
Manufacturing	5819855	5378369
Transport	830643	712611
Commerce	1822620	1703817
Professions	399839	339176
Personal service	1015037	969064
Public service	1297569	1215806
Total	19715075	18994051

GERMAN EMPIRE 1895

OCCUPATIONS	
Agriculture, cattle rearing, etc.	18068663
Forestry, hunting, fishing, etc.	432644
Mining, metal working, etc.	20253241
Commerce and trade	5966846
Domestic and other service	886807
Professions	2835014
Without occupation	3327069
Total	51770284

UNITED KINGDOM 1901

ENGLAND AND WALES

OCCUPATIONS	MALES	FEMALES	TOTAL
Professions	651543	321142	972685
Domestic	304195	1690722	1994917
Commerce	1779685	78769	1858454
Agriculture	1094765	57730	1152495
Industry	6326788	2023388	8350176
Unoccupied	1977283	9017834	10995117
Total	12134259	13189585	25323844

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SCOTLAND

OCCUPATIONS	MALES	FEMALES	TOTAL
Professions	67827	33234	101061
Domestic	26755	174475	201230
Commerce	221579	24136	245715
Agriculture	196581	40370	237311
Industry	878446	319049	1197495
Unoccupied	264893	1198618	1463511
Total	1656081	1790242	3446323

IRELAND

OCCUPATIONS	MALES	FEMALES	TOTAL
Professions	98361	32674	131035
Domestic	26087	193331	219418
Commerce	92863	5026	97889
Agriculture	790475	85587	876062
Industry	406157	233256	639413
Unoccupied	786097	1708871	2494958
Total	2200040	2258735	4458775

UNITED STATES 1900

OCCUPATIONS	MALES	FEMALES	TOTAL
Agriculture	9404429	977336	10381765
Professions	828163	430576	1258739
Domestic	3485208	2095449	5580657
Trade	4263617	503347	4766964
Man. and industry	5772788	1313294	7085992
Total	23754205	5319912	29074117
Population			76085794

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If we compare the professions with other occupations we get the following approximate ratios:

In France we have,

profession : agriculture :: 1 : 10
profession : industry :: 1 : 9
profession : commerce :: 1 : 5
profession : all others :: 1 : 50

In Germany we have,

profession : industry :: 1 : 7
profession : agriculture :: 1 : 6
profession : commerce :: 1 : 2
profession : all others :: 1 : 20

In England and Wales we have,

profession : industry :: 1 : 8
profession : commerce :: 1 : 2
profession : agriculture :: 1 : 1.5
profession : all others :: 1 : 25

In Scotland we have,

profession : industry :: 1 : 10
profession : commerce :: 1 : 2
profession : agriculture :: 1 : 2
profession : all others :: 1 : 30

In Ireland we have,

profession : agriculture :: 1 : 7
profession : industry :: 1 : 5
profession : commerce :: 1 : 0.6
profession : all others :: 1 : 40

In the United States we have,

profession : agriculture :: 1 : 9
profession : industry :: 1 : 6
profession : commerce :: 1 : 4
profession : all others :: 1 : 25

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Since academic and professional men chiefly have been instrumental in arranging programs and courses of study it is evident why the academic influence has predominated. An explanation of bad conditions in the schools, however, is no excuse for them, and since, as the figures show, the academic workers are greatly in the minority, and since the academic field is too small to accommodate the numbers which are academically trained, it is also evident that the school has not acted the part of an effective intermediary between the children and the conditions which they meet when they leave school. A great deal of cultural information is given about industry, commerce, and the like, stories are told in the school for the purpose of illustrating industrial and commercial activities, but such information is mostly verbal. It has a certain worth and should not be omitted from the school; but the actual manipulation of material as it is worked in industry, commerce, etc., the motor control without which industrial and commercial instruction is impossible, these are lacking in the school. The school as it is constituted at present has neither the furniture, nor the material, nor the personnel by which effective instruction can be secured.

With schools properly administered and with industrial, trade, and other schools established, it might be objected that a caste system will result. As it is now, however, does not that very state of affairs exist, and is not the school system one vast machine for turning out cheap office-boys, clerks, and the like? Pupils with initiative and ability in other lines are whipped into shape, by corporal punishment, if necessary, or are thrust out of the school. It must be

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remembered that with schools of different kinds and with instruction in various fields, the caste system will be broken because of the freedom of choice in the subjects taught. As it is now a pupil has little choice between a rigid curriculum and the street.

From the individual point of view the school can be much improved. From the national standpoint, likewise, improvement along the lines suggested is necessary. Each country must be able to hold its own in the markets of the world, each country must depend upon the skilled workmen which it has, each country, in short, must rely upon its trained and instructed individuals.

§ II. The Leisure of Man and the School

From the standpoint of esthetic and ethical control the school does very little. Conduct receives practically no systematic consideration. Systematic training in control of the means of cultural enjoyment is also lacking. Whatever is done along these lines is due to the initiative of teachers who are willing to spend their own time and money on activities for which the school makes little provision. Music, games, social gatherings, excursions, etc., are looked upon as side issues which may be neglected or not according as the spirit moves.

During the time left to them after their day's work we find a large number of people attracted by the cheap show, the beer garden, and more or less riotous dissipation. For adolescents who are thrown upon their own responsibility the different vices scatter their seed upon a comparatively virgin soil. The individual when he leaves school has little basis for a discrimination

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between right and wrong and practically no means for passing his time in an esthetically and culturally satisfying manner. The open-air concerts given in some cities, the various playgrounds, social centers, and athletic fields which are established, and the facilities for clubs, associations, and the like, are a step in the right direction. The elementary school, however, has too little share in such activities.

§ III. The Aim of Education

If we consider the activities which surround the child and in which he is to take a living part we must consider that it is necessary for him to exercise some control over an occupation, however insignificant, that it becomes imperative for him to offer social service of some kind. When we consider, moreover, that to control any activity, an individual must exercise self-control in some specific direction, we may say that self-control is what every individual, male or female, should strive to acquire. We may then say:

The aim of education is manifold self-control.[1]

From the standpoint of instruction and discipline we may also say:

The aim of education is material and social self-control.

Before an individual can control in a social way he must come into contact and hold intercourse with others in a manner followed by mostly all and accepted as correct and proper. This implies (1) that an indi-

[1] See Volume I: Ch. 8, and page 220.

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vidual can stand erect and speak in a clear and intelligent manner, (2) that he has some knowledge of the proper social forms, and (3) that he can read and write correctly. Before he can offer social service he must be good for something. He must be able to do something efficiently and well. Moreover, in all his actions he must conform to the highest standards and ideals of right and wrong in the circle in which he moves. In addition, an individual should be of worth as an individual. He should have a certain amount of culture and social sympathy. During his leisure moments there will then be less danger that he will become a social menace or that he will so conduct himself as to interfere with his efficiency as a social worker. If an individual is of worth as such his opportunities for social control are greatly enhanced. Back of every individual action lies the conditioning element of a sound, healthy, body. It is the dirty, ill-clad, underfed individual who slouches and shuffles and mutters his request, who is most often satisfied with low standards and ideals, who most easily falls victim to vice and crime. Wholesome food, free play, open-air exercise, good company, and the like are necessary. In the matter of social sympathy there must be considered the civic and religious duties. No one who does not strive to conform to the highest ideals of justice and humanity can be considered pure and good no matter what his creed may be.

§ IV. The Means of Education

Before the aim of education can be realised specific and concrete means must be provided. These means in brief are, (1) the school building, (2) the school per-

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sonnel, (3) the curriculum, and (4) the material and supplies. The school building and the school personnel have been considered in preceding chapters, the material and supplies have been touched upon in the first volume, and the curriculum and kind of school will be considered in the following section.

§ V. Classification of Schools

1. **Elementary school.** In the first place, the elementary school should give every individual that education which is due him as a human being and a freeman. Every child should be able (1) to stand erect and talk in a clear, distinct, and intelligent manner, (2) to communicate with others in the proper social forms, and (3) to read and write. In the second place, the school should give every child a more or less representative knowledge of the industrial, commercial, agricultural, civic, and other conditions which he is to meet when he leaves school. This does not refer to the motor training necessary for the trades and industries, and which should come somewhat later. Specific training in industry, commerce, etc., should not be attempted. But the child should be introduced to the conditions which surround him, first, that he may slowly select some in preference to others, and second, that he may have a proper appreciation of his obligations to all classes of workers. It is a mistake to wait till the years of adolescence before giving the child an environment which will bring to light his dominant interests. These should be slowly forming during all the years of school. In the third place, the elementary school should give every individual such culture and such acquaintance with his social heredity as will enable

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him to pass his leisure moments in a rational and human manner. In the fourth place, the elementary school should give systematic training and instruction in the basic forms of conduct, both juridical and social. It should also allow of means by which ethical and social practice are possible. In the fifth place, the elementary school should look after the health of every child. This implies, not only that proper exercise be allowed and directed, but that instruction in food values be given, and that medical supervision be provided and enforced. Summarising the functions of the elementary school we may give its various aspects as (1) individual-social, (2) vocational, (3) cultural, (4) ethical, and (5) physical.

In the construction of a curriculum to meet these ends less time should be given to arithmetic, a great deal less to formal grammar, and much more to geography, science, literature, and manual work. Closer correlation between manual work and the other subjects should be attempted. Thus, the construction in paper or wood of looms, spindles, mills, etc., in the case of the industrial aspect of geography, modeling in clay of the physical features of land in the case of geography and history, construction of apparatus in science, of boxes for testing seeds in the case of nature study, and the like, are instances of such correlation. Periods should be set aside for cultural and ethical instruction and discipline. The rights of the children should be carefully guarded.

In the matter of supplies, whatever is needed for manual work should be at hand. Wood, cardboard, cutting boards, knives, scissors, cloth, clay, etc., constitute some of the material. So, too, a sand table,

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seats which will support the children while working in an erect position, proper desks, etc., should be provided. The classroom should represent a miniature workshop.

If trade, industrial, and other schools are provided, the academic portion of the elementary school should end with the sixth school year. Boys who are fourteen or over may then pass to a trade or other school and complete their eight years of instruction in a vocational school. Diplomas or certificates should then be given to all pupils who have completed eight years of work, no matter what may be the nature of the school in which they have completed the last two years. For pupils who wish to continue academic study, the regulation work should be given for two more years. If conditions demand it intermediate schools should be established for the last two years of academic instruction. Some school should then be used solely for classes of the last two years and should be fed by the surrounding elementary schools.

2. **Trade school.** Trade and industry are two activities which should not be confused with each other. A trade is something very definite. It implies direct manipulation of raw material and the use of tools. Skill and practice with adequate material and proper direction are necessary. Of the various trades the following may be given as those in which instruction would be profitable, both to the individual and to society, namely, carpentry, iron and brass working, plumbing, machinist, electrician, painting (house, sign, fresco, decoration), brick laying, stone working, dressmaking, sewing, millinery, cooking, etc.

In arranging the course of study one should give more than half of the time to vocational work. The rest of

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the time should be occupied with cultural, ethical, and similar work. Thus, the first hour and a half of the morning, and the first hour and a half in the afternoon should be taken up with trade work. Academic work should come in between. The two years should be divided into four terms. If two trades were learned by each pupil in one year, four trades could be learned during the course. Two correlated trades should be taught together during the year, one in the morning session, and one in the afternoon session. With four trades at his command, an individual could probably find work all the year round.

The academic work should emphasise the content subjects. Literature, geography, history, science, and drawing should predominate. Grammar should have no place, and arithmetic should be confined to such simple problems as apply to the vocational work practised. Entertainments should be given from time to time. Social clubs should be encouraged and outings taken.

In organising a trade school the school officials will find difficulty in securing properly qualified instructors, Two plans may be followed. Students who have graduated from a training school and who have passed the proper academic and professional tests may be apprenticed for a year to some large establishment to learn the special trade which they are to teach. For this they should be allowed a year or so with regular pay. Such a year should be credited to the teacher's experience. Another plan is to advertise for high school graduates who may be engaged in the various trades. Those who pass the required tests should be given classes. In the beginning they should be required to attend lectures or conferences on pedagogical methods

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and educational theory. These may be given by the superintendents or principals. If private trade schools exist, the school officials may draw on them for instructors. To ensure progress in the methods of special instruction the school officials should require each instructor to visit large establishments and to spend at least three school days in investigating the newest processes.

Pupils need not be admitted to a trade school till they have completed their fourteenth year and have passed through the sixth year of instruction. They should then be admitted from any class in the last two years of the elementary school.

3. **Industrial school.** In an industry, man is an agent who works on raw material with machinery. He works through some intermediary. He sets processes in motion which, in turn, affect the raw material. Of the leading industries we have, the manufacture of iron and steel goods, of cotton, woolen, and silk goods, of leather and rubber goods, of paper and woodenware, of glass, porcelain, and earthenware, etc. Agriculture and forestry are important for farming regions. Two phases of an industry may be distinguished. In one, we have the manufacture of the finished product from the raw material, as, cotton goods from cotton, silk goods from the cocoon, etc. In the other, we have the manipulation of the product by machinery for the purpose of forming some article, as the manufacture of wooden or glassware, etc., the construction of the articles of commerce, and the like.

In the arrangement of a course of study a plan similar to that suggested for trade schools should be followed. Part of the time should be devoted to theo-

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retical work. As in the trade school, it is advisable that the pupils work at one industry in the morning, and at another in the afternoon. The course should provide for the acquisition of skill in at least four industries. If two years are not sufficient for this the course should be extended to three years.

In farming regions schools of agriculture and forestry should be established. Systematic instruction should be given in the cultivation of corn, wheat, oats, rye, barley, potatoes, vegetables, etc. The kinds of soils, the methods of testing seeds, the use of fertilizers, the means of destroying pests, the control of modern machinery, and everything connected with modern farming should receive attention. Fruit trees and wood trees should be studied in a similar manner. Such schools should be connected with the elementary school. The time in which instruction is most effective is the plastic age of youth. Old farmers form a less docile and receptive class of pupils, as the government extension courses will show.

Academic subjects should include among others, geography, history, literature, science, drawing, and manual work. Technical grammar is unnecessary and arithmetic should be confined to practical, correlated calculations. Entertainments, social clubs, outings, etc., should form a part of the school work as in the case of trade schools. Teachers may also be selected as suggested for trade schools. Pupils should be admitted to an industrial school only when they have reached their fourteenth year and have finished at least the sixth year of the elementary school.

4. **Commercial school.** In the construction of a course of study for a commercial school such subjects

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as writing, business forms, business law, jurisprudence, the mechanism of credit and exchange, etc., should occupy more than half of the time. The academic subjects should be cultural and should include such subjects as literature, economics, sociology, history, and geography. In the organisation of an industrial or commercial school the school officials should seek expert advice from successful business men or leaders of industry. Too often, instruction in these special branches leans towards academic theory and dilettanteism. No pupils should be allowed to take up commercial work until they have successfully completed six years of the elementary school. An age limit of thirteen years may be set. If the commercial course is two or three years a pupil upon completion of the course will be of about the right working age.

5. **Technical school.** A technical school should concern itself with instruction in the making of plans for structures and in the theoretical portion of construction work in general. Drafting, mechanical drawing, planning of types of machinery and building structures, etc., should form an important part of the course. Sanitation and hygiene should have a place in the curriculum. The academic subjects should be similar to those of the commercial school. The general method of organisation should likewise be similar.

6. **Training school.** To ensure a supply of properly trained teachers, normal or training schools are now a part of the school system. The course usually extends over a period of four years. The special subjects of instruction should be, theoretical and applied psychology, history of education, science or principles of education, general and special methods of instruction

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and discipline, and class management. Some time for practice in teaching should also be allowed. Studies closely allied to the strictly pedagogical subjects are sociology, anthropology, ethics, jurisprudence, logic, and economics. Cultural subjects are literature, a modern language, science, and art.

7. **Nautical school.** In the larger seaport cities one or more nautical schools should be established. Since the water front is usually taken up with piers, factories, depots, and the like, a seaport city may seem almost like an inland town, with the corresponding ignorance of nautical matters. For each of the nautical schools there should be a portion of the water front fitted up with boat house, rafts, etc., and a sloping beach open to the public. The school itself should be a commodious steam vessel with annexes in the shape of one or two sailing vessels. The whole equipment should be in plain view from the shore and easy of access. The work in the nautical school should be connected with some central, national department. This is necessary to ensure proper recognition of the work done by the nautical school graduate. After a thorough course in seamanship a pupil should receive a seaman's license of the proper grade. As Maxwell remarks, "It too often happens that young men who have received thorough training in our nautical school and who are efficient seamen, give up seamanship in disgust after a trial of a year or two, because the licensing authorities insist on keeping them in grades much below those which their attainments fit them to occupy." [2]

[2] *Eighth Annual Report of the City Superintendent of Schools, The City of New York*, 1906, 131, William H. Maxwell, City Superintendent.

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8. **High school.** For those who intend to follow the professions the high school has been established. This gives instruction in academic and cultural subjects. Among other subjects are mathematics, English, a modern language, a dead language, the various sciences and arts, and some practical training in the elements of the handicrafts. Pupils are usually admitted after they have completed eight years in the elementary schools.

In the different schools mentioned in the above sections the various aspects discussed in connection with the elementary school, as individual-social, cultural, ethical, and physical, should receive proper attention. Conduct should also be systematically taught and practised in all the schools.

9. **Evening departments.** If trade and industrial schools are established, evening departments become especially imperative. At present, evening departments are restricted to the elementary and the high schools. If evening instruction is to be effective, the courses should be of the same grade as those given in the daytime. Credit should be given for work done in evening schools, and such credit, if necessary, should count towards day school work. Thus, a pupil who may have been unable to finish his eight years in the day school, may make up his work at evening school, receive credit for it, and have such credit count towards a day school diploma. The same should hold for the high school. Evening high school instruction should be given in the high school buildings where proper facilities are at hand.

In addition to such academic evening schools there should be language schools for foreign adults and adolescents. Instruction should be given in the language,

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customs, history, and civics of the country. Various branches of elementary instruction may be inserted. The books used for adults should be of primary grade but of more advanced content. The story of Mary and her little lamb, for example, may appeal to the child, but will hardly interest a grown man or woman.

Evening lectures in literature, science, art, etc., are now given in the assembly rooms of the schools. If possible, such lectures should be arranged in a connected series. If the subject is of sufficient account, books may be loaned and an examination offered at the end of the course. Those who fill the proper requirements should be given the proper academic credit which should count for high school work.

Evening playgrounds, recreation centers, etc., are now open in the congested districts for the younger boys and girls. Such centers are of a social nature and aim to promote social sympathy and to elevate conduct in general. Games, literary discussion, debates, and elementary school work form a portion of the activities in the centers.

10. **Vacation departments.** In the more crowded portions of the city the schools which have a modern equipment are now thrown open during the hot summer months. Interesting manual work should be given to the classes. Playgrounds should be properly equipped so that the children can exercise and play. The vacation school should allow of much greater freedom than is allowed in the day school. The aim of the vacation school is different from that of the day school, it emphasises the social and industrial activities, and should not be hampered by the rigidity and suppression so manifest in most elementary schools.

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Where there are parks or green fields a space should be roped off, placed in charge of an assistant, and given over to the free play of the children. Swings, poles, and similar apparatus should be provided. If the sea or a river is nearby, summer schools should be established near them. In this connection, sloping beaches might be constructed along the water front and placed at the service of the children. Swimming and similar activities might be taught.

11. **Cottage school.** For truants, incorrigibles, and all those who come under the heading of delinquents, a cottage school should be established in the suburbs of the city. It should be constructed on the pavilion system. The aim of such a school should be to reproduce as nearly as possible the conditions of the home, and also to remove the child from contaminating influences. There should be a large central school, smaller buildings for industrial and similar work, and small cottages for living purposes. Green fields should surround the buildings. A child should live there for a certain period, if necessary, until his elementary education has been completed. A form of the parole system might be used to keep the children under guidance after they leave school. Before a pupil is admitted into the general fold he should be placed in a special class to receive proper initiation, as it were. The truant school with all the terrors which make of it almost a reform school can hardly be said to be a very great success.[3]

[3] See: Snedden, David S., *Administration and Educational Work of the American Juvenile Reform Schools;* Morrison, W. Douglas, *Juvenile Offenders;* Drähms, August, *The Criminal;* Ellis, Havelock, *The Criminal;* Whiteway, A. R., *Recent Object-Lessons in Penal Science;* Ferri, Enrico, *Criminal Sociology.*

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12. **Open-air grounds.** In the suburbs and outlying districts of the city, grounds should be set aside for the exclusive use of children. Such playgrounds should be preserved intact when more crowded conditions prevail. Even in the more crowded portions of the city a whole square or block should be plotted with grass and used as a children's playground. Such ground should be formed within every mile or half-mile. If the city is near water, boats should be impressed for the purpose of carrying children to green fields where they can freely play. Public parks can not be used for this purpose since they are usually filled with adults. Whatever be the expense, the city should not hesitate to appropriate land in the most crowded portions of the city for the establishment of playgrounds, beaches, and the like. In the crowded districts of the city the lack of play drives children into hotbeds of thievery and vice.[4]

[4] See: *Int. Cong. of Arts and Science*, ed. by H. J. Rogers, 8, 'Education,' and address by W. H. Maxwell, 'Present Problems of the School,' 102–115.

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CHAPTER VIII

THE SCHOOL BOARDS

§ I. The Board of Education

1. Selection. The board of education usually consists of business men of wide experience and broad culture, and professional men of reputation. The members are selected by the mayor and serve without pay. The term of office is usually short, from three to five years, but carries with it probability of reappointment. Members bind themselves in this way to assume the responsibilities of the position for a short period, which can be increased, if necessary, by means of reëlection. The general tendency seems to be against large boards. From five to fifteen seems to be the proper number.[1]

The chief objection against a board politically appointed is the entrance of politics into the public school system. When the civil service employees depend upon politically appointed board members or board-elected superintendents for promotion, assignment, etc., then civil service loses much of its value, and in the higher positions, becomes sounding brass which is flourished in public. If superintendents had life tenure or a term of twenty years, they would not become so

[1] Chancellor, William Estabrook, *Our Schools: Their Administration and Supervision*, Ch. II. A paid Board of five members seems advisable, to direct the business, educational, supply, clerical and building departments.

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readily petty men subservient to the board which elects them.

2. **Function.** The board of education deals directly with business matters and indirectly with pedagogical control. It should have full control of the money which is appropriated and should be authorised to spend it as it sees fit. Among other duties are the acquisition of land for school purposes, the building of schools, the construction of salary schedules, the awarding of contracts for material, supplies, etc., the enactment of by-laws, and the approval and disapproval of suggestions, recommendations, and decisions of subordinate officials. Considerable provision in the acquisition of school sites should be shown by the board of education. The plan suggested by Maxwell is a good one.[2] In outlying districts where land is still cheap, the board of education should buy up land in advance. The districts should be plotted into squares and sufficient land bought for purposes of school construction. Should the population move in a direction different from that anticipated, the land can be exchanged or sold at small loss. In the case of supplies and material, expert advice should be sought if necessary to ensure the greatest efficiency and economy. The material used in the schools should be compared with that used in business and elsewhere. In general, the board of education should leave pedagogical matters to the board of superintendents. It should hold the board of superintendents responsible for the condition of the schools as regards instruction, discipline, and the welfare of both teachers and children. The

[2] William H. Maxwell, City Superintendent of Schools, in *Seventh Annual Report*, 1905.

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pedagogical means necessary to realise the ends sought should be devised by the superintendents.

§ II. The Board of Superintendents

1. **Selection.** In general, the superintendent should have some knowledge of educational and pedagogical matters. Experience in teaching is a desideratum while advanced university study is much to be desired. The term of office of the superintendent is much too short. It should be at least fifteen or twenty years or during good behavior instead of the five or six which are usually the case. The superintendent should not be compelled to spend too much of his energy in doubtful manipulation, and should feel free to pursue his work without feeling insecure in his position. With short terms efficiency must often give way to policy.

2. **Function.** In its relation to the board of education the board of superintendents can only recommend and suggest. Its duties are strictly educational and pedagogical and in these it should be allowed full control. Of the various duties which should be fulfilled by the board of superintendents are recommendations for the establishment of schools, construction of courses of study, formation of lists of books to be used by the principals in their selection for the classes, formation of lists of supplies, selection of teachers according to definite regulations and requirements, formulation of reports, tabulation of records, and the like. In the construction of a course of study, minimum and maximum requirements should be definitely set in the manner suggested in a preceding chapter. Each subject outlined in the course should be accompanied by explicit directions on effective methods of instruction.

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The lists of books, supplies, etc., should be an open one from which the principals can select.[3] This seems to operate effectively and to be accompanied with the least corruption.

The connecting link between the board of education and the board of superintendents is the city superintendent. He should be the best man that the board of education can obtain. Besides transmitting to the board of education the reports, suggestions and recommendations of the superintendents he should present some of his own. If necessary, he should be able to suggest men of the proper material for the position of superintendent. He should, moreover, be able to look sufficiently above and beyond the mass of school detail so as to see what progress is being made elsewhere and to select such features as will benefit the school system of which he is head.

§ III. The Board of Examiners

1. **Selection.** The examiner should be a man who has had some teaching experience and who has a second or third academic degree. He should be versed in the theory and practice of education. Education, psychology, anthropology, philosophy, sociology, economics, ethics, and jurisprudence should be some of the studies in which he has done advanced university work. An examiner should be selected from a civil service list. Experts from different parts of the country might be called upon to advise the superintendents or some public board in the matter of selecting examiners. The

[3] See Jenks, Jeremiah, *Citizenship and the Schools*, Ch. IX, and Edson, A. W., Appendix C, *Seventh Annual Report of the City Superintendent of Schools*, New York City, 1905.

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term of the examiner should be for fifteen or twenty years, or during good behavior. To prevent sloth and incompetency, and to shut out political, social, or religious influences, the board of education should set specific regulations which will so bind the examiners that they will become little more than automatic, though highly efficient, marking agents. As little discretion as possible should be given to them. Discretion implies personal judgment, and wherever personal judgment is allowed, corrupt and insidious practices can easily obtain a foothold.

2. **Civil service in education.** Civil service implies that, other things remaining the same, candidates who appear for examination have an equal chance of passing, and that no one is favored either directly or indirectly. It assumes that the same standards and tests are applied to all. It means that all personal equations are eliminated. It intends that the candidates, as such, are unknown to the examiner. Any means by which one candidate can obtain information which is shut out from the others becomes a gateway for the entrance of undue influence.

A distinction must here be noted. The examination system deserves the support of every one who believes in merit and the selection of the fittest. It is a guarantee of progress and efficiency. The least slackening in the requirements will give a foothold to an avalanche of demoralising influences of all kinds. But it must also be remembered that, because a person is an examiner, the virtues of his office do not necessarily inhere in him. Attacks on examiners should not be considered on that account as attacks on the examination system, as such.

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Where wide discretionary powers are given to the examiners it is evident that a misuse of such powers can hardly be proven. An examiner should be so hemmed in by regulations that he becomes simply a skilled recording machine. Moreover, every candidate should know the requirements, the method of procedure of the examiners, the relative value of the different portions of the examination, his own rights, and the duties of the examiners.

3. **The eligible list.** When an eligible list is published all the data connected with it should also be published. If the list is the result of two or three tests, the marks of such tests should be published with the average rating. Everything should be open for the inspection of candidates or their friends. In appointments from the list the order of the standings should be rigidly followed. The regulation which gives the right of choice of any of the first three candidates is a somewhat doubtful one as can be easily seen. No one should be allowed to select candidates out of their order on the list, and candidates themselves should not be allowed to waive their right in this connection. A position should be offered to each candidate, and only his written refusal should justify selection of a candidate below him. Even though examination practices be corrupt, the eligible list is a distinct gain as far as civil service is concerned, and it should be rigidly followed.

4. **The written examination.** A great deal of opposition will always exist against the written examination when used as a means of selecting individuals for a position. In any distribution of individuals according to special ability, the curve of distribution will show

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that those of medium ability are massed towards the center of the curve, and that they greatly outnumber the exceptionally efficient. By their numbers and the resulting vociferation they will always succeed in attracting a certain amount of attention, and at times, in interfering with the operations of civil service in education. Again, men who have attained a certain age, and who have had extended experience, will always hold forth their experience and their age as indications of their fitness and excellence for higher positions. Age as such, however, has nothing to do with efficiency, and men who have had experience of a high order, need have little fear in the matter of expressing such experience. It is highly probable that individuals, who, only late in life, become aware of the opportunities in their profession, can hardly have given much attention to intensive and extensive study of their work during the years of their greatest vitality and initiative.

In all fields of work it will be found that individuals who have stood out as having special ability have given indications of such ability early in life and have been recognised soon after their twenty-fifth or thirtieth year. In literature, philosophy, art, and science this will be found to be the case, and even in education the same holds. It is during the years in which an individual is putting forth his greatest effort that we want his work. In the acme of his efficiency he will then be in his advanced position and will benefit the service in which he is. In the matter of 'experience,' moreover, it is a fact that the best work of the teacher is done during the first five or ten years. After that he loses the enthusiasm and the interest of his youth, works more automatically, and tends to look upon

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teaching as a means of providing for his progeny and for his old age. In the case of promotion license, if experience is made a prerequisite, it becomes the most important factor in the matter of examinations, for without it, no candidate can even take the written examination. If experience is to count in the final results, it should be given a subordinate place. It should, however, be a prerequisite for higher licenses. After the eighth or tenth year, the number of years of teaching experience of a candidate makes practically little difference in his efficiency. By that time he has reached the acme in his work. On that account extended experience should have little weight in the final results.

(*a*) *Age of candidates.* The age limits of candidates should be, (1) from eighteen to thirty for an elementary school license, (2) from twenty-one to forty for a high school license, and (3) from twenty-five to forty-five for a principal's license or assistant to principal's license. Teaching experience should be required as a prerequisite in the case of examinations for promotion but it should have no place or very little place in the final rating. Classroom practice at best is a more or less pedestrian kind of experience which can be acquired by the fifth year and which becomes automatic by the tenth. Further advance is then possible in intensive study of the underlying theory and in an investigation of problems dealing with basic aspects in education.

(*b*) *Subject matter of the examinations.* Candidates for an elementary teacher's license should be examined in (1) general and special methods of instruction and discipline, (2) the history and principles of education, and (3) psychology. There is a difference be-

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tween the principles of education and psychology. The former includes ethical and sociological aspects which have no place in psychology. Candidates should have a high school or a college diploma, and should have a certain amount of educational training and instruction. Candidates for high school license should be examined in (1) general method, (2) the special method of their subject, (3) the history and principles of education, and (4) the subject matter which they are to teach. A candidate for high school license should be a college graduate. Candidates for the principal's license should be examined in (1) school and class management, (2) general and special method, (3) the history and principles of education, and (4) ethics and jurisprudence. The last named subjects have as yet received but little recognition. When, however, it is remembered that in the large cities a principal has control of from twenty to fifty or more teachers, and from one to two thousand or more children, it seems evident that he should have some knowledge of the basic truths of ethics and jurisprudence. In addition to pedagogical lore a principal should understand the various aspects of human relationships. He is not an abstract educational machine but an individual who must act with humanity and justice. Candidates for the principal's license should have from seven to ten years of teaching experience. In such experience should be counted the equivalent of one year's study for the second academic degree, and of three years' study for the third academic degree. Outside of being demanded as a prerequisite, experience should have but little weight in the final rating. Candidates who have not the experience of the right kind or of the right

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amount should not be allowed to take the examination. In this way experience counts practically everything, since without it, a teacher will not be able to present himself for examination.

In selecting questions the examiners should not restrict themselves to one book nor should they give previous questions too often. They should not base more than two questions on a single book, nor should any question be taken verbatim from previous papers. The reason for this seems evident. Before they mark the papers the examiners should read them over once so as to get the general drift of the answers. They should then read the papers a second time and place the papers in four or five general groups according to their general excellence. The papers should then be read a third time and accurately marked. If the use of English is a feature, a certain mark might be added for the arrangement of sentences, use of words, and general impression made by the paper.

(*c*) *Numbering the papers.* The plan of giving a number to each candidate is the one which is usually followed. There is nothing, however, to prevent an examiner from finding out the numbers of certain candidates, nor is there anything to prevent a board member from indicating in a refined manner that he is interested in some special numbers. In numbering the papers which are written by candidates, some such plan as the following might be followed, especially in examinations for higher licenses in which competition is keenest. Each candidate should be given a tag with a number. This number should be written on a card with the candidate's name and address, and handed to the examiner. The tag should be affixed to the

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papers on which the candidate writes his answers. As soon as the papers have been handed in they should be taken by some one from the superintendent's office, and should have the tags replaced by a number which is written both on the papers and on the tag. The tags should be locked up in a safe and placed in the superintendent's charge. After the papers have been marked the tags can be put back on the papers and the names of the candidates ascertained. Little extra time will be needed for this, and greater secrecy will be ensured.

5. **The oral test.** In addition to the written test an oral test is usually given to the candidates who have successfully passed the written tests. The oral test, however, in which the examiner is supposed to judge personality, manner, etc., is open to serious criticism. The oral test allows of considerable discretion on the part of the examiner, and in his discretionary judgment may be hidden motives which can not be proven. It seems reasonable to suppose that an individual who has successfully passed through eight or ten years' experience in the classroom under supervision of principal and different superintendents can not be judged unfit by a strange examiner at the end of twenty minutes. Conduct is a matter which is tested by continuous practice and not by a short quiz. If the oral test is given, it should have very little weight in the final rating, and should be given rather to determine whether any candidate requires further investigation. The oral test should not count as much as the written. To prevent possible discrimination, the official regulations should limit an examiner's judgment between certain limits which will not affect the final ratings to any great extent.

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6. **Suggestions to candidates.** Before an intending candidate begins to study he should carefully map out the field which he intends to cover. If he is an expert in his line he may carefully outline a series of topics which cover the subject. He may look through the standard works of his specialty and distribute the topics according to their relative value as indicated by the number of pages devoted to them. He may also see what is required by the examiners by reading previous papers which have been set by them. By distributing the questions according to their frequency, he may judge of the possibility of any question appearing again. Moreover, certain topics are of such importance that they must be set if the paper is to have any value.

In the history of education, the topics should be studied under different aspects. Some of the educators and movements emphasise one thing, and some another. They may be important for any or all of the following, (1) aim of education, (2) theory of education, (3) means of education, as (*a*) course of study, (*b*) method or theory of instruction, (*c*) method or theory of discipline, and (*d*) books written or practical work done. For example, Rousseau is known for his *Émile*, Froebel for his theory and kindergarten practice, Pestalozzi for his methods, and Herbart for his theory of interest, apperception, the formal steps, concentration, and government. The original works should be read and studied first, and then the more condensed histories of education taken up.

The principles of education should likewise be studied in a specialised manner. A candidate should know how to give a definition, a description, an illus-

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tration, an explanation, a development, or an application of any of the topics concerned. He may be required to discuss, criticise, or compare. To the rule-of-thumb teacher some of these distinctions may seem more or less verbal and meaningless in actual practice. But in a category so logical as definition, for example, a teacher has an indispensable means of selecting rational from irrational instruction and discipline. The crude conceptions of discipline which exist are due in part to the hazy notions which exist as regards it. A slight error in the conception of his work may set a teacher wrong for a lifetime.

Definition is a logical category which has to do with terms. The terms must be so defined as to be inclusive of all specific instances which are intended to be held together under a single name, law, principle, etc. There must also be an exact correspondence between the situation involved and the term used. The important thing in a definition is a statement of the genus plus such essential attributes as mark any particular instance as belonging to or as not belonging to the class defined. The rules of definition as given by Jevons are:[4]

(1) A definition should state the essential attributes of the species defined.

(2) A definition must not contain the name defined.

(3) The definition must be exactly equivalent to the species defined.

(4) A definition must not be expressed in obscure, figurative, or ambiguous language.

(5) A definition must not be negative where it can be affirmative.

A description is not so rigid as logical definition and deals rather with external aspects such as will aid in

[4] Jevons, W. Stanley, *Lessons in Logic*, 109, 110.

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the recognition of the object or situation concerned. It is simply a colligation of facts and is empirical in nature. Description has to do with representative and striking characteristics which enable one to identify or to recognise some object or situation. Such characteristics are more or less typical or general and may apply to any of a number of instances.

In illustration, a description becomes localised in time and place by specific and concrete references to a known object or situation. To secure clearness and vividness some known and recognised type is brought forward as an example to emphasise the characteristics of a described type. Through illustration, the most vague and empty formulæ may become filled with content and animated with life.

Further analysis is necessary in the case of explanation. According to Mill, "An individual fact is said to be explained, by pointing out its cause, that is, by stating the law or laws of causation, of which its production is an instance."[5] Careful study of an object or situation is often necessary before its essential characteristics can be determined and their various connections seen. More loosely, the requirements of an explanation may be satisfied by showing the constituent and essential parts of a situation, by resolving it into simpler parts, by showing its genesis, or by pointing out its use or its place in a series of conditioning causes.

Development refers to increasing differentiation between part and part and to the resulting series of changes in form, structure, and use or function. Development implies that a situation is capable of successive and progressive changes. It implies both certain

[5] Mill, J. S., *A System of Logic*, 1: 540, and Bk. III, Ch. XII.

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potential powers and a furthering environment which stimulates and supports these powers.

Application implies that through the mediation of an agent theory is brought to bear on practice. Application refers to the guidance afforded by theory in the control of a concrete situation. The use of a formula, law, principle, rule, etc., is tested by concrete and real conditions. Here are necessary not only some knowledge but also some skill and familiarity with the tools and material which are necessary for the work in question.

An illustration may make clearer the use of the categories just mentioned. Take, for example, the topic, 'memory.' A question may ask for a definition, a description, an illustration, an explanation, an application, etc. For definition we may give either, (1) Memory is the mental power (genus) of specialised and localised ideal revival (essential attribute), or (2) Memory is a conscious moment (genus) which has definite reference to some situation already past (essential attribute). As an illustration we may give the efforts of a witness on the stand to revive some information. As a description we may set forth the aspects of impression, retention, recall, and recognition. As an explanation we may discuss physiological plasticity and retentiveness, the laws of repetition, intensity, vividness, etc., the laws of association, and the factor of fatigue. In application we may emphasise correlation of subject matter, appeal to as many senses as possible, and the different points set forth in the discussion of drill. Rigid demarcation can not always be made. It is seen, however, that when a definition or an explanation is called for, a vague and general discussion will hardly be accepted.

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Discussion, criticism, and comparison refer chiefly to the method in which the various facts and statements are presented. Discussion presupposes (1) a clear statement of the matter under discussion, (2) an impartial presentation of its good features, as, advantages, uses, etc., (3) an impartial presentation of its bad features, as, disadvantages, objections, etc., and (4) a summing up in which a valuation of the whole is given. Criticism includes topics (2) and (3) of the preceding. Criticism does not necessarily imply destructive comment or abuse, but construction and valuation as well. Criticism may deal at times with (1) the form of the statement and (2) the content. Often a preliminary analysis is necessary to show the general nature of the ground to be examined and of the point of view which is taken. Finally, comparison includes (1) a statement of the essential characteristics of the two objects or situations to be compared, (2) a presentation of likenesses and differences between the two, and (3) a *resumé* which emphasises likenesses or differences or superiority of one over the other.[6]

In questions on the method of instruction the categories above presented are also used. In addition, the following series of topics will also guide the student in attacking his work. A candidate should know (1) the aim, purpose, use, or function of any subject, (2) the general method applicable, (3) the special method which is to be used, (4) devices peculiar to the subject, (5) the material necessary for effective instruction, (6) possible correlations with (*a*) the child's instincts, feelings, motives, and knowledge, (*b*) environmental objects and situations, as, school and home activities, occupations,

[6] See Stout, G. F., *Analytic Psychology*, 2: 168.

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current events, etc., and (*c*) other subjects in the same grade and in the preceding grades, and (7) common errors of instruction with possible corrections. If he is preparing for a higher license, a teacher should live his methods in his classroom work. He should apply effective methods in his daily work.

In answering questions on method most teachers fall into the error of answering in vague and general terms and in leaving out essential portions of actual practice. Method is concrete and particular and should be discussed in specific and concrete terms. A skilled teacher does much of his best work unconsciously and automatically. When he is called upon to explain his method he often assumes that much will be taken for granted on the ground of its simplicity, and so leaves out many important points which he knows, but which he does not express concretely. For example, the following is an instance of a general presentation: "Number work should be begun by having children measure distances, etc." This statement is too general. More specifically it should be: "Let the child take a foot rule and measure the side of the room, etc." Still more specific is the following direction: "I should ask John to take his rule, measure the front of the room, and tell the class how many feet there are between the front door and the window, etc." A candidate should improve his ability to describe his own work by examining the different steps in his daily lessons and by recording them in an explicit description.

When he is in the examination room a candidate should apportion the time allowed according to the marks allowed for each question. Inexperienced can-

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didates usually begin by writing all they know on the first questions and then find that they have little time left to answer the rest. As soon as a candidate receives his questions he should look them over and see exactly how many questions are to be answered and what is required in each. The parts of each question should receive attention. The time for each question should then be calculated. Taking 100 as the denominator and the value of the question as the numerator, the candidate will obtain the fractional part of the time which he should spend on the question. Thus, if a subtopic is worth .06 and the time allowed for the paper is 3 hours or 180 minutes, the question should receive .06 of 180 minutes or 10 minutes. To allow a margin for possible revision or correction 9 minutes should be given to the topic. The questions should be read to find out whether a description, a discussion, or the like is called for. The candidate should number the answers by topics and subtopics according to the arrangement of the questions.[7]

[7] Much of the above on civil service in education is based on the system outlined and enforced by Superintendent William H. Maxwell of New York City.

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